OLUME XXII

NUMBER 19

MOTOR AGE

CHICAGO, NOVEMBER 7, 1912

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MOTOR AGE

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Volume XXII NOVEMBER 7, 1912 No. 19

Contents

MOTOR AGE REVIEW OF 1912 ROAD RACING..... 5
Ralph de Palma declared individual champion of America and Georges Boillot champion of Europe—Statistics of the sport

GENERAL ELECTRIC AND RUSHMORE AT LAW..... 12
Clash of patent claims on electric lighting and starting system reaches eastern courts

FRANK WHEELER BUYS OUT HIS PARTNER..... 13
Because of ill health, George M. Schebler quits carbureter business, disposing of his interests

EDITORIAL—ROAD RACING AND ITS LESSONS..... 14

IS MOTOR ORGANIZATION OF GREAT MERIT..... 15
Scottish Automobile Club declared to be well worthy of emulation in America

PHOENIX WINDS UP WITH A TRACK MEET..... 16
Tetzlaff in a Fiat lowers Arizona mile record, which is afterwards beaten by Oldfield

MILWAUKEE STRUGGLES WITH DEFICIT..... 17
Scheme evolved by dealers' association to secure extension of credit to March 1

PROTECTS PENN'S NEW STATE ROAD SYSTEM..... 18
Governor Tener refuses to permit trolley lines to encroach on Keystone state highways

BAY STATE EXPECTS A FIXED-SPEED LAW..... 19
Massachusetts fears reasonable limit clause, which has been so satisfactory, will be dropped

FRANCE PREPARING FOR ANNUAL PARIS SALON..... 20
No great mechanical changes in store for 1913 in Europe—Some new cars and motors are described

DETACHABLE UPHOLSTERY EUROPEAN IDEA..... 40
Adoption of all-steel body by Birmingham Small Arms Co. brings about change in upholstering

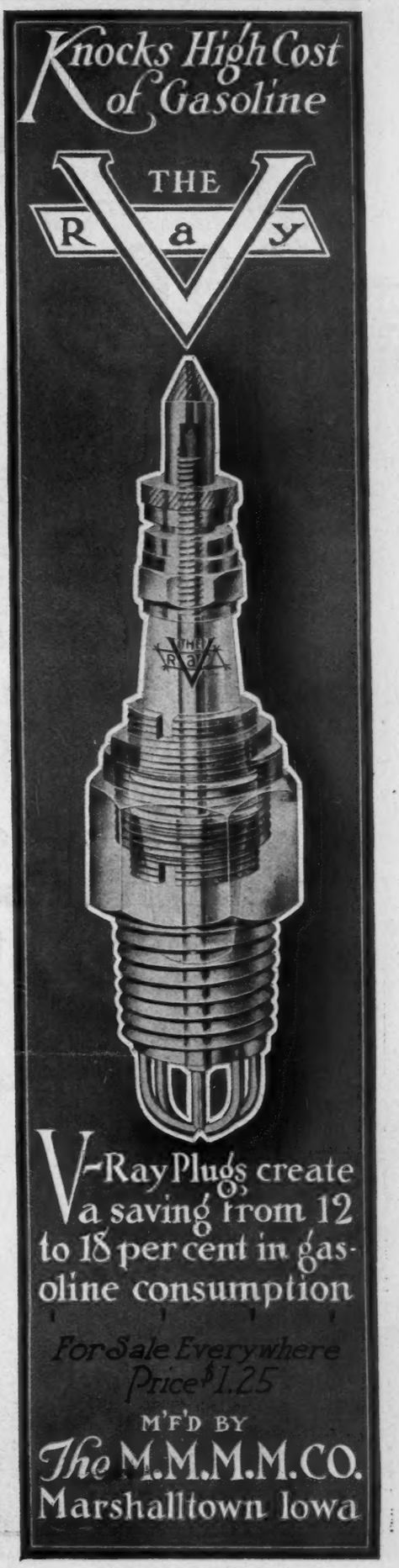
LARGER SIX ADDED TO HAVERS LINE..... 42
Description of the 1913 models

FOUR KLINEKAR MODELS FOR SEASON OF 1913..... 44
Description of 1913 line

REORGANIZED RUTENBER PRODUCT REFINED..... 47
Description of new motors

DEPARTMENTS

Coming Motor Events..... 15
Routes and Touring Information 26
Housing the Motor Car..... 30
Readers' Clearing House..... 32
Realm of Commercial Car..... 36
Motor Car Repair Shop..... 48
Current Motor Patents..... 49
Motorists' Kindergarten..... 50
From the Four Winds..... 52
Among Makers and Dealers... 54
Development Briefs..... 56
Brief Business Announcements. 58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Motor Age

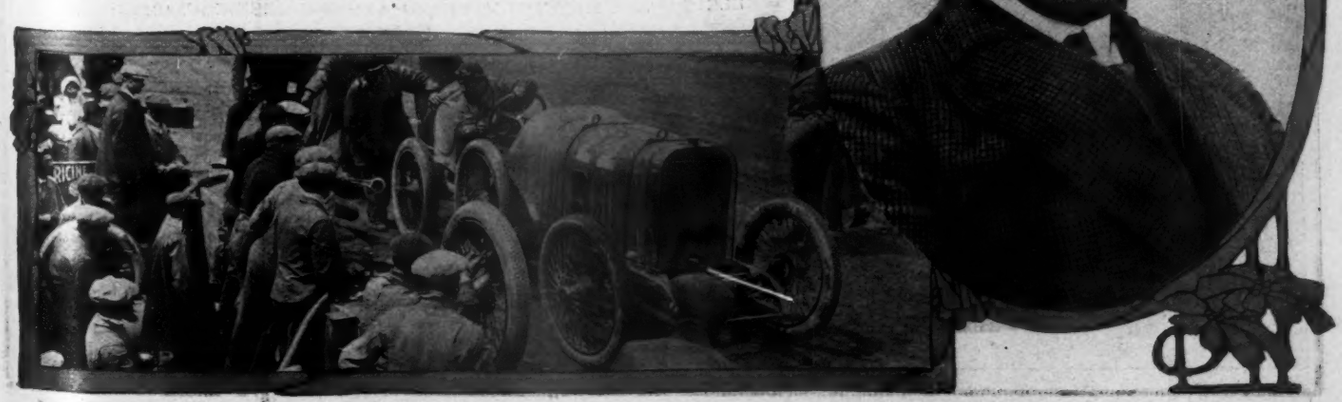
Motor Age Review of 1912 Road Racing

RALPH DE PALMA, AMERICAN CHAMPION, AND HIS MERCEDES CAR

Ralph de Palma Wins Individual Championship of America—Fiat Makes Best Car Showing—Boillot and the Peugeot Europe's Trump Cards

By C. G. Sinsabaugh

ROAD racing in 1912 developed in Ralph de Palma the champion driver of the year so far as the American sport is concerned. As for Europe, the victory of Georges Boillot in the French grand prix unquestionably gives him the title on the other side of the Atlantic. So far as the champion car is concerned, it would seem to Motor Age that the best showing of the season in American contests was made by the Fiat, the first time since Motor Age started the yearly compilation of road racing statistics in 1909 that a foreign make has attained this honor. In Europe there is no questioning the rights of the Peugeot to the title of champion car.



GEORGES BOILLOT, CHAMPION OF EUROPE, AND HIS SPEEDY PEUGEOT

RECORD OF THE DRIVERS

Driver	Start	First	Second	Third	Unplaced
Anderson	4	0	1	1	2
Bayse	1	1	0	0	0
Bergdoll	4	0	3	0	1
Bragg	2	1	1	0	0
Bruce-Brown	1	0	0	1	0
Campbell	1	1	0	0	0
Cooper	4	1	0	0	3
DePalma	5	4	0	0	1
Devore	4	0	1	2	1
Disbrow	1	0	0	1	0
H. Endicott	2	2	0	0	0
Evans	2	1	1	0	0
Fuller	1	0	0	1	0
Gochenauer	1	0	0	1	0
Hamlin	1	1	0	0	0
Hastings	2	0	1	0	1
Houston	1	0	1	0	0
Hughes	9	1	1	0	7
Joerman	2	1	0	1	0
Klipstein	1	0	1	0	0
Mason	1	0	1	0	0
Merz	2	1	0	1	0
Mulford	5	0	2	1	2
Nikrent	4	0	0	1	3
Pullen	3	1	1	0	1
M. Roberts	3	1	0	0	2
Rossi	1	0	0	1	0
Smith	1	0	0	0	1
Soules	1	0	1	0	0
Tetzlaff	5	3	0	0	2
Tower	2	0	1	1	0
Trussel	1	0	0	1	0
Wishart	6	0	0	1	5

Unplaced: Anthony, 1; Ballert, 1; Barnes, 1; Bell, 1; Bennett, 1; Bigelow, 1; Biggs, 1; Blast, 1; Blizzard, 2; Bramlette, 1; Bunnell, 1; Burman, 1; Campbell, 1; Carlson, 1; Carlson, 1; Chandler, 1; Charle, 1; Chenowith, 1; Clark, 4; Coop, 1; DeLovelace, 1; Dingley, 1; Faulkner, 1; Ferguson, 1; Fernando, 1; Fontaine, 1; Gilstrap, 1; Greer, 1; Griffith, 1; Hammond, 1; Hearne, 2; Henning, 1; Hobbs, 1; Hollenbeck, 1; Horan, 1; Jeffkins, 1; Johnson, 1; Jones, 1; Klein, 1; Knox, 1; Krouse, 1; Lees, 1; Lewis, 1; Lyman, 1; Maddux, 1; Marsh, 1; McKey, 1; Miller, 1; Moore, 1; Nelson, 1; Oldfield, 2; Parker, 1; Pipher, 1; Rice, 1; Rooney, 1; Rosher, 1; Ruckstell, 1; Seifert, 1; Shain, 1; Smith, 1; Snyder, 1; Verbeck, 1; Washburn, 1; Whalen, 1; Weaver, 1; Wood, 1; Wordingham,1.

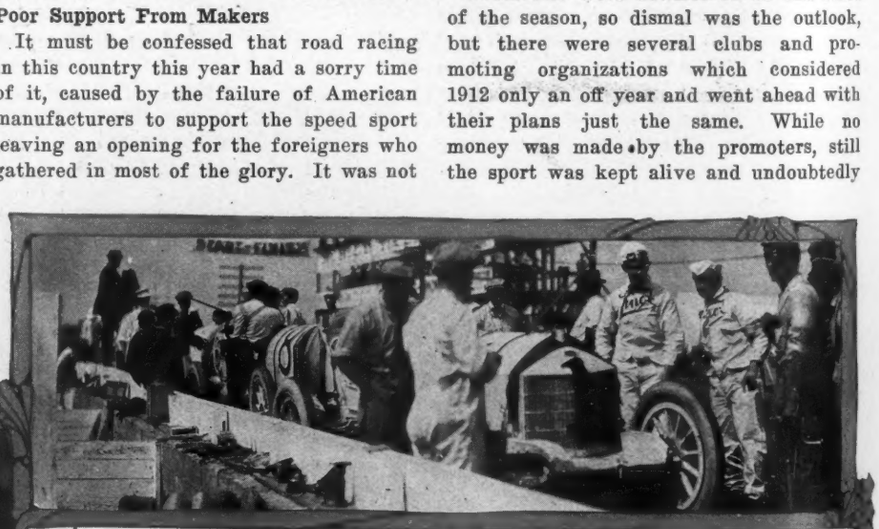
CALEB BRAGG, FIAT, GRAND PRIX WINNER

De Palma slips into the shoes worn in 1911 by Harvey Herrick through his winning of four out of the five road races in which he competed, whereas the Fiat's honors were won through the scoring of four firsts, and one second in twelve starts. While Boillot only won one road race in Europe, that victory was so effective there is no questioning his right to the title of individual European champion. His mount, the Peugeot, was invincible, not only on the road but in hill-climbs as well. Not only did the Peugeot win the grand prix, but it also captured both classes in the Le Mans road races and distinguished itself by climbing Gaillon hill at the rate of 101.5 miles an hour.

Poor Support From Makers

It must be confessed that road racing in this country this year had a sorry time of it, caused by the failure of American manufacturers to support the speed sport leaving an opening for the foreigners who gathered in most of the glory. It was not a foreign invasion, however; neither did foreign makers back the drivers who piloted their cars. It was the free lances who kept the sport alive, aided by a couple of American car manufacturing concerns which believed that such contests would bring them reputations for their product which could be gained in no other way. They were right in this respect and doubtless they feel well repaid for their outlay.

Promoters were bewildered at the start of the season, so dismal was the outlook, but there were several clubs and promoting organizations which considered 1912 only an off year and went ahead with their plans just the same. While no money was made by the promoters, still the sport was kept alive and undoubtedly



ELGIN SCENE SHOWING MULFORD AND HIS MECHANIC, CHANDLER

HUGHES, OF THE MERCER TEAM

COMPARISONS OF THE LAST 4 YEARS OF ROAD RACING

FASTEST RACES EACH YEAR

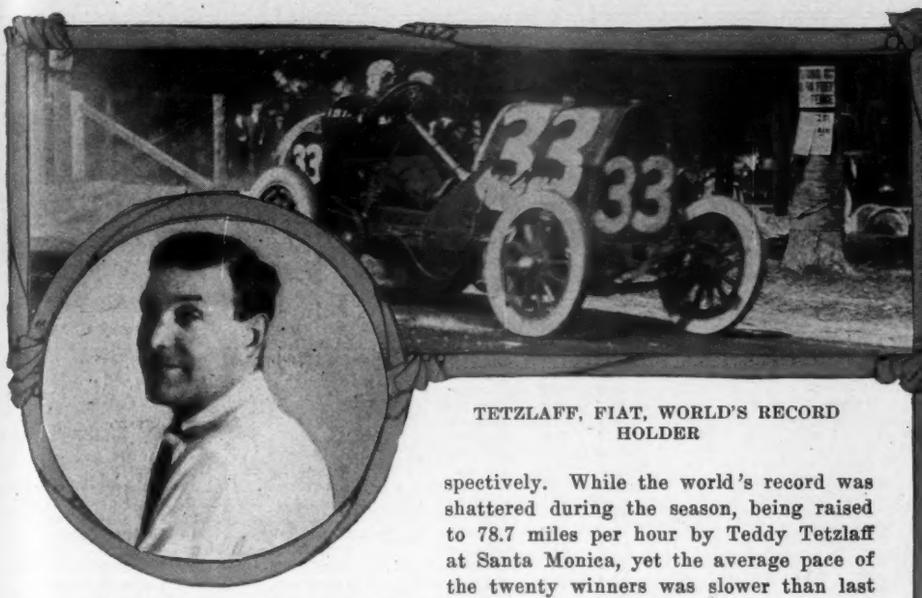
Year	Race	Dis.	M.P.H.	Driver and Car
1909	Riverhead, L. I.	113.7	69.6	Chevrolet, Buick
1910	Santa Monica	115	73.22	Tetzlaff, Lozier
1911	Santa Monica	202	74.62	Herrick, National
1912	Santa Monica	303	78.7	Tetzlaff, Fiat

CHAMPION CAR EACH YEAR

Year	Make of Car	Started	First	Second	Third	Unplaced
1909	Chalmers	22	5	3	2	12
1910	Lozier	8	4	1	0	3
1911	National	21	9	3	2	7
1912	Fiat	12	4	1	0	7

CHAMPION DRIVER EACH YEAR

1909	Bert Dingley	7	2	3	1	1
1910	Ralph Mulford	5	2	1	0	2
1911	Harvey Herrick	4	3	0	0	1
1912	Ralph de Palma	5	4	0	0	1



TETZLAFF, FIAT, WORLD'S RECORD HOLDER

1912 furnished the best sport America has witnessed in road events. On the roll of honor are Santa Monica, Tacoma, Elgin and Milwaukee which promoted good meets, while there were also the Bakersfield road race and the two desert events run last month.

In going through the records of the season working on this annual review of road racing, Motor Age finds that while there have been fewer events decided in 1912, still the year will stand favorable comparison with its predecessors. There were twenty races run as against twenty-seven last year, twenty-one in 1910 and twenty-seven in 1909. The average distance of the 1912 events was greater than ever before, the average being 232 as against 206, 211 and 211 in 1911, 1910 and 1909, respectively. While the world's record was shattered during the season, being raised to 78.7 miles per hour by Teddy Tetzlaff at Santa Monica, yet the average pace of the twenty winners was slower than last year, the mark being 60.25 miles per hour as against 63.22 last year, 53.8 in 1910 and 49.2 in 1909.

Ninety-Two Finishers

Ninety-two of the 202 starters finished in 1911 and seventy-one of the 156 caught the judges' eyes this year, a slightly better showing than that of the preceding season. Yet the general average pace of the seventy-one was slower than that of the ninety-two, being 54.49 miles per hour at against 59.51. It's hard to explain this, for as a rule the competition this year was among the higher powered cars, so that if anything this pace should have been faster. Yet whereas there were sixteen cars that averaged better than 70 miles an hour last year, this season there were only three that gained this distinc-

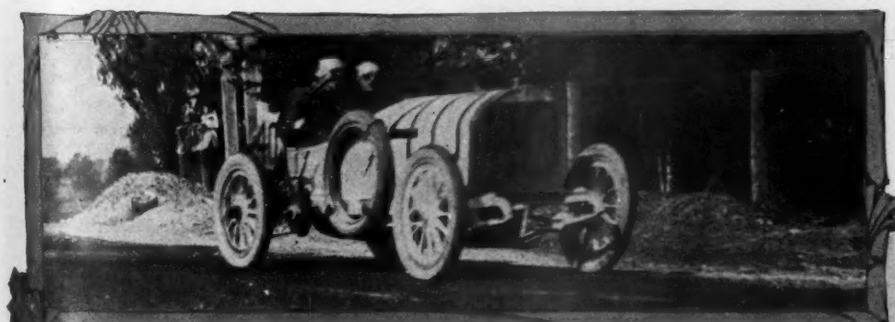
RECORD OF THE CARS

Car	Start	First	Second	Third	Unplaced
Benz	6	0	3	1	2
Buick	8	0	0	1	7
Cadillac	3	0	1	0	2
Case	3	0	1	0	2
Falcar	4	0	1	1	2
Fiat	12	4	1	0	7
Flanders	5	1	2	1	1
Franklin	2	1	0	0	1
Knox	6	0	2	1	3
Mason	7	3	1	0	3
Maxwell	2	1	0	1	0
Mercedes	12	3	0	1	8
Mercer	21	3	2	0	16
Mitchell	2	0	1	0	1
National	7	0	2	3	2
Pope-Hartford	3	0	0	2	1
Stevens-Duryea	1	1	0	0	0
Stutz	14	3	1	2	8

Unplaced: American, 2; Apperson, 1; Bergdoll, 1; Cole, 2; Columbia, 1; Ford, 5; Herreshoff, 1; Hupmobile, 1; Kisselkar, 2; Klinekar, 1; Lozier, 2; Michigan, 1; Midland, 1; Nyberg, 1; Oakland, 1; Pope-Toledo, 1; Premier, 1; Rayfield, 1; Regal, 1; Reo, 2; Schacht, 2; Simplex, 2; Studebaker, 1; Tincher, 1; Warren, 1; Winton, 1.

STARTING AND FINISHING

	Distance	No. starters	No. finishers
Grand Prix	410	12	4
Vanderbilt	300	8	5
Elgin free-for-all	302.5	10	3
Elgin trophy	254	9	5
Illinois	203	4	2
Bakerfield	212	15	3
Santa Monica free-for-all	303	7	3
Santa Monica 231-300	151.5	8	3
Santa Monica 161-230	101	8	5
Tacoma	250	8	4
Tacoma, heavy car	200	5	3
Tacoma, medium heavy	150	4	3
Tacoma, medium	150	4	1
Tacoma, light car	100	5	5
Los Angeles-Phoenix	511	12	5
San Diego-Phoenix	400	21	7
Pabst	221	8	2
Aurora	152	6	5
Jencks	101	3	1
Wisconsin	174	3	2



MORTIMER ROBERTS, MASON TEAM

ERWIN BERGDOLL, BENZ, SECOND IN THREE BIG RACES

STATISTICS OF 1909-1910-1911-1912

	1912	1911	1910	1909
Number of road races	20	27	21	27
Number of miles	4,645	5,591	4,449	5,100
Average distance of each race	232	206	211	211
Average miles per hour each winner	60.25	63.22	53.8	49.2
Average each car that finished	54.49	59.51	51.58	50.62
Fastest road race	78.7	74.62	73.22	69.9
Slowest road race	23.7	27.03	26.41	24.8
Number of starters	156	202	206	223
Average number of starters	7⅛	7½	9½	8¼
Number of cars allowed to finish	71	92	82	94
Percentage of finishers	45.5	44.8	39.7	42
Number of makes competing	44	44	55	63

AVERAGE MADE BY ALL CARS FINISHING IN TWENTY AMERICAN ROAD RACES IN 1912

M.P.H.	Dist.	Car	Driver	Race
78.7	303	Fiat	Tetzlaff	Santa Monica
77.9	303	Fiat	Bragg	Santa Monica
77.3	303	Benz	Bruce-Brown	Santa Monica
69.5	151.5	Mercer	DePalma	Santa Monica
69.3	410	Fiat	Bragg	Grand prix
68.9	300	Mercedes	DePalma	Vanderbilt
68.9	302.5	Mercedes	DePalma	Elgin free-for-all
68.8	300	Mercer	Hughes	Vanderbilt
68.6	200	Fiat	Tetzlaff	Tacoma
68.4	254	Mercedes	DePalma	Elgin trophy
67.5	302.5	Benz	Bergdoll	Elgin free-for-all
67.4	254	Knox	Mulford	Elgin trophy
67.3	200	Knox	Mulford	Tacoma
67.3	151.5	Case	L. Nikrent	Santa Monica
66.6	150	Stutz	Cooper	Tacoma
66.6	302.5	Knox	Mulford	Elgin free-for-all
66.1	203	Stutz	Merz	Illinois
65.8	250	Fiat	Tetzlaff	Tacoma
65.6	203	Stutz	Anderson	Illinois
65.5	410	Benz	Bergdoll	Grand prix
65.4	410	Stutz	Anderson	Grand prix
65.4	250	Benz	Bergdoll	Tacoma
65.0	152	Mercer	Hughes	Aurora
64.9	300	Mercedes	Wishart	Vanderbilt
64.6	200	National	Devore	Tacoma
64.5	250	National	Devore	Tacoma
64.3	250	Fiat	Verbeck	Tacoma
64.2	300	Stutz	Anderson	Vanderbilt
64.2	254	Stutz	Merz	Elgin trophy
63.9	151.5	Case	Disbrow	Santa Monica
63.8	254	Mason	M. Roberts	Elgin trophy
63.7	150	National	Devore	Tacoma
63.3	254	Stutz	Anderson	Elgin trophy
62.3	152	Mercer	Pullen	Aurora
61.9	150	Mercer	Pullen	Tacoma
61.9	101	Maxwell	Joerman	Santa Monica
61.8	410	Fiat	Oldfield	Grand prix
61.6	300	Mercedes	Clark	Vanderbilt
61.2	150	Pope-Hartford	Rossi	Tacoma
61.1	100	Flanders	Evans	Tacoma
60.5	101	Mason	Endicott	Jencks
60.5	100	Flanders	Tower	Tacoma
60.2	101	Flanders	Evans	Santa Monica
59.4	101	Flanders	Tower	Santa Monica
58.8	221	Mason	M. Roberts	Pabst
58.8	101	Regal	Anthony	Santa Monica
58.6	100	Maxwell	Joerman	Tacoma
55.6	173.5	Mason	Endicott	Wisconsin
54.06	152	Falcar	Trussel	Aurora
52.7	101	Reo	Krouse	Santa Monica
52.0	221	Falcar	Hastings	Pabst
51.4	152	Mason	M. Roberts	Aurora
50.6	100	Ford	Bennett	Tacoma
49.9	152	Falcar	Hastings	Aurora
48.3	100	Oakland	Barnes	Tacoma
46.7	173.5	Mason	Mason	Wisconsin
37.4	212	Stutz	Bayse	Bakersfield
29.9	212	Mitchell	Klipstein	Bakersfield
29.6	212	Buick	Gochenauer	Bakersfield
28.2	511	Franklin	Hamlin	Los Angeles-Phoenix
27.03	511	Cadillac	Soules	Los Angeles-Phoenix
25.8	511	National	Fuller	Los Angeles-Phoenix
23.7	400	Stevens-Duryea	Campbell	San Diego-Phoenix
21.9	511	Cadillac	Bramlette	Los Angeles-Phoenix
21.4	511	Cadillac	McKee	Los Angeles-Phoenix
21.1	400	National	Houston	San Diego-Phoenix
20.9	400	Apperson	Ferguson	San Diego-Phoenix
18.8	400	Mitchell	Greer	San Diego-Phoenix
17.5	400	Kisselkar	Coop	San Diego-Phoenix
10.3	400	Stutz	Washburn	San Diego-Phoenix
6.7	400	Simplex	Rice	San Diego-Phoenix

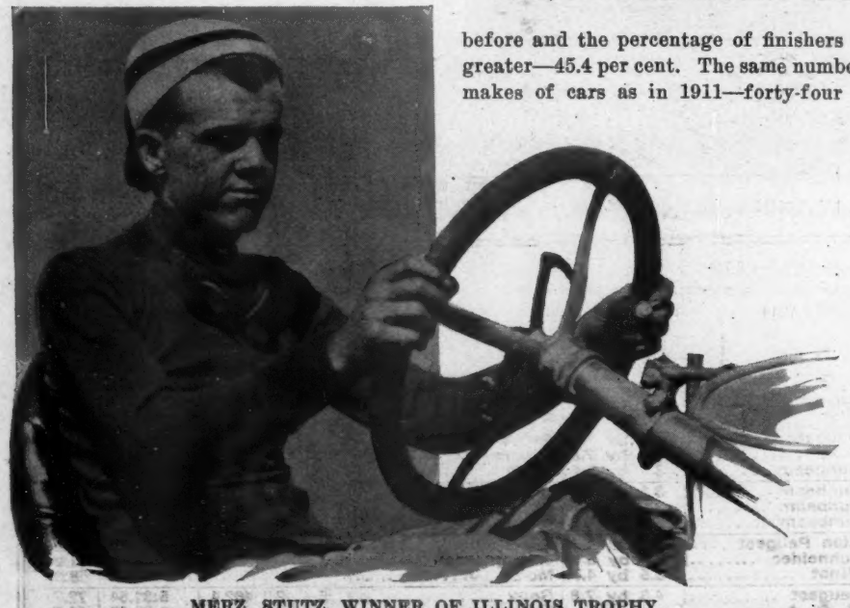
tion, and those three competed in the free-for-all at Santa Monica, when Tetzlaff broke the world's record.

Hard Luck for Stutz

This brings out the hard luck of the Stutz in that classic, for had the Stutz been able to have finished the three in the 70-miles-an-hour class would have been five. The two Stutzes at Santa Monica were running when the race was called off and there was only 25 seconds between them. They had averaged 73 miles an hour, yet this wasn't fast enough to get across the line for the final signal of Starter Wagner.

Summing up 1912, though, one finds that it produced the fastest road race ever run —Santa Monica with 78.7—also the slowest, 23.7 in the San Diego-Phoenix desert race. The races averaged longer than ever before and the percentage of finishers was greater—45.4 per cent. The same number of makes of cars as in 1911—forty-four was represented, although this number was reached because of the desert road races which brought in cars entered and driven by owners, whose makers are not in accord with the racing game.

GOUX, OF FRENCH PEUGEOT TEAM



MERZ, STUTZ, WINNER OF ILLINOIS TROPHY

Five of the 1911 fixtures were scratched this year—the Fairmount Park road races at Philadelphia, the Oakland meet, the one at Cincinnati, Savannah and Denver. That accounts for the poor showing. The Quakers wanted to continue their classic, but were stopped by the park commission, and the other four quit voluntarily. On the other hand, we had new blood in the shape of Tacoma and Milwaukee. The success of Tacoma, which built its course and staged its meet in 1 month, means that there will be other road races on the Pacific coast in 1913. Milwaukee made a financial fizzle but scored a sporting success, so it is likely the Badgers will try to again run the Vanderbilt and grand prix.

Close Call for Elgin

Elgin had a close call. The Chicago Motor Club, which had conducted the 1910 and 1911 meets, feared a failure and 7 weeks before the dates selected for the meet, threw up the sponge. The Chicago Automobile Club, which inaugurated road racing in the middle west at Crown Point in 1909, thereupon undertook the promotion of the meet. Five races were run without accident and while there was a small attendance the first day, the second day brought out a crowd larger than ever before witnessed the races at Elgin.

Only Two Fatalities

The sport of 1912 was remarkably clean so far as accidents were concerned, for the twenty races were run off without a fatality. No driver or mechanic was even seriously injured in any of them with the exception of de Palma at Milwaukee. However, the season left one black mark

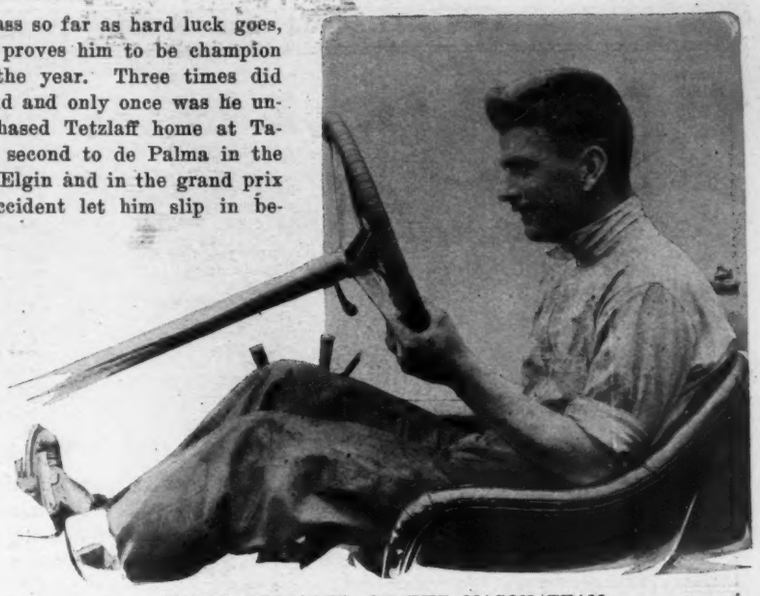
on the road racing escutcheon—the accident during training at Milwaukee, when David Bruce-Brown was killed and his mechanic, Tony Scudaleri, so badly injured he died a week later. Still, in comparison with preceding years, this is a remarkable record. This freedom from accident was not confined to road racing alone, either, for in neither speedway meets or dirt track racing is there a single death charged up to the season of 1912.

Reverting back to the showing made by the drivers, one finds that de Palma's honors in the Mercedes were truly won—there was no fluke about it. The turning point in de Palma's career came at Elgin. He had won a small-car race in a Mercer earlier in the season at Santa Monica but at Elgin he struck his stride. He not only won the famous Elgin National trophy from Mulford, who had won it in 1910, but he kept a going and landed the free-for-all as well. Jumping to Milwaukee, he followed this success by also winning the classic Vanderbilt. Three days later he made a bold bid for the grand prix as well. While Bragg seemed to hold de Palma safe, it is almost a certainty de Palma would have been second had it not been for the accident on the last lap which eliminated him and let Bergdoll in the Benz become runner-up to Bragg.

Tetzlaff's Hard Luck

When Teddy Tetzlaff came east for the Elgin meet, he apparently had a clear road to the championship. He had won three firsts on the Pacific coast and the world's record was his. All he had to do was to make only a fair showing at Elgin and at Milwaukee to land the title. At Elgin he broke down coming to the tape and was out of it. In the Vanderbilt he was making a runaway of the race when mechanical troubles eliminated him just at a time when victory seemed certain. It was almost the same story in the grand prix. Again he essayed to run away from his rivals and again it looked as if he would be successful. But again he had mechanical troubles and was forced to watch the finish of the race from the pits.

Erwin Bergdoll, winner of the 1911 Fairmount Park road race, is almost in the Tetzlaff class so far as hard luck goes, for his record proves him to be champion runner-up of the year. Three times did he finish second and only once was he unplaced. He chased Tetzlaff home at Tacoma; he was second to de Palma in the free-for-all at Elgin and in the grand prix de Palma's accident let him slip in behind Bragg.



HARRY ENDICOTT, OF THE MASON TEAM

Bragg himself is entitled to considerable credit for his grand prix victory, although he cannot be given consideration as a championship possibility because he did not campaign as much as did the others in the first flight. He started only twice—once at Santa Monica and again at Milwaukee, getting one first and a second.

De Palma, Tetzlaff, Bergdoll, Bruce-Brown, Mulford, Bragg and Hughes were the ones who made the fight interesting in the big-car events, but the competition among the drivers of the smaller cars was just as keen. Hughes was in both divisions but he failed to equal his showing of 1910. He started nine times, but only twice did he get in the money. His chief trick was in capturing the 231-300 class at Elgin for the second time, while in the Vanderbilt he was second to de Palma.

RIGAL, DRIVER OF ENGLISH SUNBEAM

Races Well Divided

Only three of the drivers won more than one race—de Palma, Tetzlaff and Harry Endicott. The last named might rightly be given a championship diploma, for he started only twice and each time he won—the Jencks trophy at Elgin and the Wisconsin cup at Milwaukee. Mortimer Roberts, Endicott's mate on the Mason team, also showed himself to be a good driver, for of his three starts he won once and the other two times he finished, although not in the money. His fourth in the Elgin National was a consistent performance.

Although Gil Anderson did not win a single road race in his Stutz, still he drove

RESULTS IN FIVE ROAD RACES RUN IN EUROPE DURING SEASON OF 1912

Race	Date	Car	B & S	Driver	No. Starters	No. Finishes	Distance	Time	M. P. H.
Targa Florio Sicily	May 26	S. C. A. T.		Scipe	10	8	632	23:37.19	26.74
	Second	Lancia		Garretto				25:07.38	25.1
	Third	Fiat		Gioradano				25:41.04	24.6
Grand Prix of France Free-for-all	June 25-26	Peugeot	4.3 by 7.8	Boillot	46	14	956	13:58.02	68.7
	Second	Fiat	5.9 by 7.8	Wagner				14:11.08	67.5
	Third	Sunbeam	3.1 by 5.8	Rigal				14:28.13	66.0
Grand Prix of France 183 cubic inches	June 25-26	Sunbeam	3.1 by 5.8	Rigal	31	8	956	14:38.36	64.8
	Second	Sunbeam	3.1 by 5.8	Reota				14:39.51	64.7
	Third	Sunbeam	3.1 by 5.8	Medinger				15:59.41	59.9
Le Mans, France 183 cubic inch class	Sept. 9	Lion Peugeot	3.07 by 6.1	Zuccarelli	14	8	402.4	6:12.25	64.8
	Second	Schneider	3.1 by 5.8	Champoiseau				6:30.36	61.9
	Third	Vinot	3.5 by 4.7	Molon, Jr.				7:16.13	58.0
Le Mans Sarthe cup	Sept. 9	Peugeot	4.3 by 7.8	Goux	5	2	402.4	5:31.54	72.7
	Second	S. P. A.		Leduc				6:55.15	58.2

STUDEBAKER TEAM, BOB EVANS AND JACK TOWER

most creditably, getting one second and a third, the former in the Illinois cup won by his team mate, Merz, and the latter in the grand prix itself—better than most victories.

Cooper, Bayse, Merz, Hamlin, Campbell, Evans and Joerman were others who won road races in 1912. Of these Merz is the best known, through his work in previous years. Merz got a first and a third, but after Milwaukee the Stutz people gave Gil Anderson the preference, Merz not getting a chance at Milwaukee.

Hamlin's victory in the Los Angeles-Phoenix desert race has a tinge of the romatic in it in that it gave the Franklin man something for which he had striven for 5 years. Hamlin had been a contestant in every one of the desert races but never had been able to get the decision until last month when he led the field home. Twice he was second. Now that he has attained his ambition he announces he is through with racing altogether.

Showing of the Cars

So much for the drivers, now for the cars they drove. In this department one finds that there were only six different makes that can be considered, three American and three of foreign construction—Mercer, Stutz, Mason, Fiat, Mercedes and Benz. The last three named of course were in the limelight most because of their size. Tetzlaff, Bragg, and Oldfield were the ones to gain fame for the Fiat, while de Palma was the mainstay of the Mercedes. In choosing the champion car, it was hard to decide between the two. Fiat had four firsts and one second in twelve starts and the Mercedes three firsts and a third in the same number of starts. But the Italian car is entitled to more con-

TABULATION SHOWING RESULTS OF TWENTY ROAD RACES RUN AT MILWAUKEE, ELGIN,

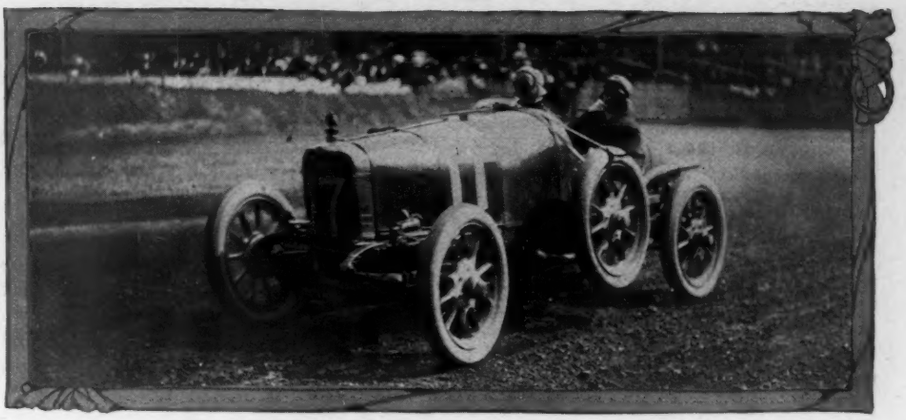
Race	Date	Car	B. &S.	Driver	No. starters	No. finish	Distance	Time	M. P. H.
Grand Prix Milwaukee, Wis.	Oct. 5	Fiat	5 1/8x7 7/8	Bragg	12	4	410	359:27.44	69.3
	Second	Benz	6.2x6.3	Bergdoll				374:58.38	65.5
	Third	Stutz	4 3/4x5 1/2	Anderson				375:22.47	65.4
	Fourth	Fiat	5 7/8x7 7/8	Oldfield				397:54.69	61.8
Also started: Mercedes, Clark, 50 laps, still running; Benz, Horan-Burman, 47 laps, still running; Mercedes, DePalma, 51 laps; Fiat, Tetzlaff, 30 laps; Lozier, Fontaine, 21 laps; Mercer, Hughes, 16 laps; Mercedes, Wishart, 3 laps; Benz, Burman, 2 laps.									
Vanderbilt Cup Milwaukee, Wis.	Oct. 2	Mercedes	5.2 x7.06	DePalma	8	5	300	260:31.54	68.9
	Second	Mercer	4.39x5	Hughes				261:14.24	68.8
	Third	Mercedes	5 1/8 x7.06	Wishart				276:35.75	64.9
	Fourth	Stutz	4 3/4 x5 1/2	Anderson				279:40.95	64.2
	Fifth	Mercedes	5 1/8 x7.06	Clark				291:39.75	61.6
Also started: Lozier, Nelson, 26 laps; Fiat, Tetzlaff, 25 laps; Knox, Mulford, 2 laps.									
Free-for-All Elgin, Ill.	Third	Mercedes	5.2x7.06	DePalma	10	3	302.5	265:36.25	68.9
	Aug. 31	Benz	6.2x6.3	Bergdoll				270:28.28	67.5
	Second	Knox Six	4 3/4x5 1/2	Mulford				274:08.72	66.6
Also started: Fiat, Hearne, 26 laps; Mercer, Wishart, 24 laps; Mercer, Hughes, 17 laps; Mercedes, Clark, 5 laps.									
Elgin Trophy Elgin, Ill.	Aug. 31	Mercedes	5.2x7.06	DePalma	9	5	254	223:20	68.4
	Second	Knox Six	4 3/4x5 1/2	Mulford				226:09	67.4
	Third	Stutz	4 3/4x5 1/2	Merz				236:43	64.2
	Fourth	Mason, special	3 7/8x5	M. Roberts				238:17	63.8
	Fifth	Stutz	4 3/4x5 1/2	Anderson				239:57	63.3
Also started: Fiat, Hearne, 26 laps; Mercer, Wishart, 24 laps; Mercer, Hughes, 17 laps; Mercedes, Clark, 5 laps.									
Free-for-All Santa Monica, Cal.	May 4	Fiat	5 7/8x8	Tetzlaff	7	3	303	230:57	78.7
	Second	Fiat	5 7/8x8	Bragg				233:05	77.9
	Third	Benz	6.1 x8	Bruce-Brown				235:32	77.3
Also started: Stutz, Lewis; Stutz, Cooper; Simplex, Dingley; Fiat, Oldfield.									
Free-for-All Tacoma, Wash.	July 6	Fiat	5 7/8x7 7/8	Tetzlaff	8	4	250	227:00.45	65.8
	Second	Benz	6.2x6.3	Bergdoll				230:49.85	65.4
	Third	National	5 x5 11/16	Devore				232:28.25	64.5
	Fourth	Fiat		Verbeck				232:56.15	64.3
Also started: Stutz, Cooper; Cole, Blizzard; Mercer, Hughes; Knox, Mulford.									—
Illinois Trophy Elgin, Ill.	Aug. 30	Stutz	4 3/4x5 1/2	Merz	4	2	203	184:32.25	66.11
	Second	Stutz	4 3/4x5 1/2	Anderson				186:14.15	65.6
Also started: National, Whalen, 9 laps; Rayfield, Hobbs, 2 laps.									
Heavy-Car Tacoma, Wash.	July 5	Fiat	5 7/8x7 7/8	Tetzlaff	5	3	200	174:31.65	68.6
	Second	Knox	4 3/4x5 1/2	Mulford				178:10.15	67.3
	Third	National	5 x5 11/16	Devore				185:42	64.6
Also started: Mercer, Hughes; Stutz, Cooper.									
Medium-Heavy Tacoma, Wash.	July 5	Stutz	4 3/4x5 1/2	Cooper	4	3	150	135:00	66.6
	Second	National	5 x5 11/16	Devore				141:10.15	63.7
	Third	Pope-Hartford		Rossi				146:53.70	61.2
Also started: Mercer, Hughes.									
231-300 Class Santa Monica, Cal.	May 4	Mercer	4 3/8x5	DePalma	8	3	151.5	130:43	69.5
	Second	Case	4 3/8x5	L. Nikrent				134:25	67.3
	Third	Case	4 3/8x5	Disbrow				142:08	63.9
Also started: Warren, Miller; Schacht, Shaw; Buick, Devore; Mercer, Jeffkins, Midland, Seifert.									

sideration in view of the fact that it smashed the world's record at Santa Monica and because it clearly demonstrated at Milwaukee, before mechanical trouble eliminated Tetzlaff, that it was faster than the others, or else Tetzlaff will take more chances than will the others.

Benz Consistent Performer

As for the Benz, that always was a factor, although never a winner. Bergdoll fought hard but couldn't quite make it, while Bruce-Brown, the one time he started in an American road race this year, could not quite hold the flying Tetzlaff. Burman and Horan drove Benzes at Milwaukee, but their cars were dull of speed.

Mercer, Stutz and Mason were factory propositions in that the manufacturers supported racing and made an organized attempt to gather in the honors. It would be hard to give the preference to any of the three, for each has a fine record. On percentage the Mason might win but it started fewer times than the others. In seven starts Mason cars won three firsts and a second. The Mason used the Duesenberg engine. As for the Stutz with three firsts, one second and two thirds in fourteen starts, it created a record for itself for reliability and speed and finishing ability that will live long. The Mercer started twenty-one times, winning thrice, and being second twice.



ENGLISH SUNBEAM, WHICH SURPRISED EUROPEAN MOTOR WORLD

Road racing was fortunate to have for backers such enthusiastic amateur sportsmen as E. J. Schroeder, whose car de Palma drove; W. H. Bertrand, who backed Clark; E. E. Hewlett, who raced Tetzlaff, and E. C. Patterson and R. J. Collier, who tried to import the Peugeots for Elgin and Milwaukee.

SANTA MONICA, TACOMA AND ELSEWHERE IN THIS COUNTRY DURING SEASON OF 1912

Race	Date	Car	B. &S.	Driver	No. starters	No. finish	Distance	Time	M. P. H.
Aurora Cup Elgin, Ill.	Aug. 30	Mercer	4.39x5	Hughes	6	5	152	140:40.11	65.0
	Second	Mercer	4⅜x5	Pullen				146:31.45	62.3
	Third	Falcar	4⅛x5¼	Trussel				169:19.3	54.06
	Fourth	Mason, Special	3⅞x5	M. Roberts				178:11.74	51.4
	Fifth	Falcar	4⅛x5¼	Hastings				183:57.53	49.9
Also started: Mercer, Wishart, 13 laps.									
Medium-Car Tacoma, Wash.	July 5	Mercer	4⅜x5	Pullen	4	1	150	145:13	61.9
Also started: Mercer, Bergdoll; Mercer, Hughes; Cole, Blizzard.									
Pabst Blue Ribbon Trophy Milwaukee, Wis.	Oct. 4	Mason	3⅞x5	Roberts	8	2	221	225:08.71	58.8
	Second	Falcar	4⅛x5¼	Hastings				225:05	52.0
Also started: Falcar, Chandler, 23 laps; Mercer, Pullen, 22 laps; Mercer, Hughes, 21 laps; Mercer, Wishart, 14 laps; Case, Nikrent, 5 laps; Bergdoll, Rooney, 5 laps.									
Wisconsin Trophy Milwaukee, Wis.	Oct. 4	Mason	3⅛x5	Endicott	3	2	173.5	186:44.79	55.6
	Second	Mason	3¾x5	Mason				222:40.35	46.7
Also started: Mason, Snyder, 3 laps.									
Jencks Trophy Elgin, Ill.	Aug. 30	Mason, Special	3⅛x5	Endicott	3	1	101	100:42.9	60.57
Also started: Ford, Henning, 6 laps; Herreshoff, Wordingham, 1 lap.									
161-230 Class Santa Monica, Cal.	May 4	Maxwell	4⅛x4¼	Joerman	8	5	101	97:57	61.9
	Second	Flanders	4 x4½	Evans				100:39	60.2
	Third	Flanders	4 x4½	Tower				102:00	59.4
	Fourth	Regal	3¾x4	Anthony				102:53	58.8
	Fifth	Reo	4 x4	Krouse				114:53	52.7
Also started: Buick, Nikrent; Ford, Rosher; Ford, Charle									
Light-Car Tacoma, Wash.	July 5	Flanders, Special		Evans	5	5	100	98:20	61.1
	Second	Flanders, Special		Tower				99:04.35	60.5
	Third	Maxwell		Joerman				102:19.50	58.6
	Fourth	Ford		Bennett				118:30	50.6
	Fifth	Oakland		Barnes				123:15.55	48.3
Bakersfield, Cal.	Feb. 22	Stutz	4¾x5½	Jack Bayse	15	3	212	344:59	37.4
	Second	Mitchell		Klipstein				425:25	29.9
	Third	Buick		Gochenauer				428:49	29.6
Also started: Knox, Moore; Stutz, Ruckstell; Klinekar, Weaver; Nyberg, Hammond; Pope-Hartford, Maddox; Flanders, Klein; Buick, Hollenbeck; Buick, Blast; National, Parker; Reo. Marsh; Ford, Lyman.									
Los Angeles-Phoenix	Oct. 26-28	Franklin Six		Hamlin	12	5	511	18:10.22	28.2
	Second	Cadillac		Soules				18:54.05	27.03
	Third	National		Fuller				19:45.06	25.8
	Fourth	Cadillac		Bramlette				23:18.27	21.9
	Fifth	Cadillac		McKee				23:46.31	21.4
Also started: American, Pipher; American, Bunnell; Simplex, Faulkner; Hupmobile, Jones; Buick, L. Nikrent; Mercedes, Bigelow; Schacht, Bell.									
San Diego-Phoenix	Oct —	Stevens-Duryea		Campbell	21	7	400	16:49.20	23.7
	Second	National		Houston				18:55.00	21.1
	Third	Apperson		Ferguson				19:07.29	20.9
	Fourth	Mitchell		Greer				21:16.00	18.8
	Fifth	Kisselkar		Cook				22:47.52	17.5
	Sixth	Stutz		Washburn				38:50.00	10.3
	Seventh	Simplex		Rice				58:53.00	6.7
Also started: Buick, Campbell; Mercedes, Johnson; Pope-Hartford, Griffith; Franklin, Carlson; Studebaker, Wood; Columbia, Smith; Knox, De Lovelace; Pope-Toledo, Ballert; Tincher, Lees; Winton, Carlson; Premier, Fernando; Michigan, Gilstrap; Buick, Biggs; Kisselkar, Chenowith.									

General Electric and Rushmore at Law

Clash of Patent Claims on Electric Lighting and Starting Devices

TRENTON, N. J., Nov. 4—Suit has been entered in the United States district court for the district of New Jersey by the General Electric Co. against the Rushmore Dynamo Works, charging infringements of the Barry and Steinmetz patents, Nos. 884,555 and 713,523, which are alleged to cover certain principles of winding and regulating electric dynamos involved in the electric lighting and starting systems used in the motor art.

The Rushmore company has proceeded on the principle that patent No. 1,016,037, granted to Samuel W. Rushmore, January 30, 1912, for an electric lighting system for motor cars does not infringe the rights of the complainant's patents.

The suit has been started, but the matter is not likely to come to an issue before the middle of January and may be heard before vacation in 1913, although this is by no means certain.

The Barry patent was granted April 14, 1908, to C. E. Barry, and is for a system of regulating dynamo electric machines. The chief element of the idea is its provision for limiting maximum voltage of the generator, irrespective of its speed or load. The device was primarily intended to cover generators driven from the axles of railway cars, but the principle is said to cover motor cars as well. In accomplishing the object the inventor resorts to two windings with a system of balances to control the voltage.

The Steinmetz patent was granted to C. P. Steinmetz for a compound-wound generator, November 11, 1902. It covers a method of compensating for the variation in voltage due to variation in permeability of the magnetic circuit. This is accomplished by automatic compensation; diverting current by a field coil; using parallel circuits; two magneto-motive forces; passing current through a field coil.

On behalf of the defense it is stated by Mr. Rushmore that the Rushmore patent, granted specifically for an electric lighting system on vehicles, does not infringe either of the other patents cited in suit. The dynamo is driven from the propelling axle or engine at widely differing rates of speed. In order to prevent the burning out of the lamps when the voltage is high, due to the high rate of speed of the propelling mechanism, or the destruction of the storage battery from overloading, some system of compensation is required. Rushmore's invention consists essentially of a ballast coil made of iron or other metal having a high positive resistance temperature coefficient when heated and so arranging the various parts that sudden rises in voltage and consequent rushes of current are opposed by the ballast coil, proportionately to the rises in voltage and the fluctuations are absorbed by the battery.

According to the statement of Mr. Rushmore, his patent was granted after a close scrutiny and familiarity with the prior art and the claims of his patent were drawn by Dr. Albert F. Ganz of Stevens and George Cooper Dean, electrical and patent law expert.

In commenting on the Barry and Steinmetz patents, Mr. Rushmore says that in the Barry device it is attempted to control the voltage of the dynamo irrespective of current output, with individual ballasts to protect each lamp. The Steinmetz patent seeks merely to compensate for variation in magnetic permeability of his dynamo when driven at constant speeds in order to maintain constant voltage at widely varying loads, according to Mr. Rushmore.

While the formal answer has not yet been drawn up, Mr. Rushmore states that the Barry patent covers a principle that is not practical and the Steinmetz patent is anticipated by the prior art.

TO REARGUE SPEEDOMETER SUIT

New York, Nov. 3—Serious illness which has befallen United States District Judge Platt will result in a rehearing of the suit of the Warner Instrument Co. against Stewart & Clark for alleged infringement of the patent covering the split-ring magnet used in the construction of speedometers manufactured by both companies.

The case was argued before Judge Platt in April and has been held under advisement by him ever since. Recently the dangerous character of the jurist's illness became apparent and as he was unwilling to delay matters further, he notified the litigants that the matter would have to be reargued.

A motion has been made to place the cause near the head of the current calendar and it is quite likely that a hearing will be had during the week of November 18. According to the attorneys, nothing new has developed since the original argument and the same briefs will be filed that were submitted before.

PREPARING TO MAKE MAXWELLS

New York, Nov. 4—The manufacturing schedule of the Maxwell-Briscoe Motor Co. for 1913 is being framed in accordance with the action of the United States district court which authorized the issuance of $1,500,000 of receivers' certificates to finance the undertaking.

Progress was reported by the officers who have the work in hand, but no inkling of its scope has been made public. The whole enterprise is a temporary expedient for the purpose of advancing the work so that it will be possible to turn out Maxwell cars for 1913 at the beginning of the marketing season.

The sale of the property to a reorganizing corporation and the continuance of its activities so that a sale can be made on a better basis than scrap are the immediate objects to be attained.

The deal with the Flanders Motor Co. remains in a state of uncertainty. It has been announced at United States Motor headquarters that appraisements have been made on each side and that agreement as to terms is a mater of negotiation. It was positively stated that no official development would be announced prior to November 11, when the form of the decree of sale will be discussed before Judge Hough.

In the meantime the outstanding stocks of the parent corporation and the claims of the creditors are being deposited with the Central Trust Co. and it is said that the total of claims now deposited amounts to nearly 75 per cent.

SHIPPING RELIEF PROMISED

New York, Nov. 4—Good news of the industry was contained in the optimistic statements issued by numerous representative railway officials as to the alleviation of the shortage of freight cars and the prospect for an adequate supply by the time the motor car shipping season begins. The net shortage up to November 2 was more than 40,000 but to the gratification of the motor industry it is announced that the exceedingly heavy movement of grain during October has brought forward the peak of the railroads' load so that it will probably be passed before the end of November. The total net shortage is 12,881 more than reported at the last fortnightly period. Presidents of the Atchison, Wabash, Illinois Central, Northwestern and Great Northern report full traffic but little congestion. The New York Central and Erie have more than they can handle, but both roads are hopeful about cleaning up in a few days.

The fine weather for shipping during the past 6 weeks is generally given as the reason for the degree of facility with which the situation has been handled. If the weather continues good through November and fairly good in December, the traffic problem will be normal during the car shipping season, according to railroad officials.

What amounts to unofficial notice has been served upon the railways of the United States by the interstate commerce commission that the railways must adjust the present arrangements concerning the prompt return of freight cars that have been diverted from their own companies. Franklin K. Lane, of the commission, calls attention to the fact that it is little less than stealing for one railroad to withhold and use the cars of another railroad, par-

Frank Wheeler Buys Out His Partner

ticularly during periods of stress like that noted in the present grain movement.

The commission has issued a circular to the railroads to increase the speed of freight trains and calling attention to the fact that 25 miles a day is too small an average movement for freight cars. Another recommendation is for a higher per diem demurrage charge so that poorly equipped companies will have less motive for withholding the cars of better equipped roads.

James S. Marvin, traffic manager of the N. A. A. M., has a statement from one railroad which has 175 motor cars, showing that on November 1 the company had only sixteen of the cars in service on its own lines. The remainder, 159 cars, were being used by other roads; needless to say that their service is not in the shipment of motor cars.

The attitude of the interstate commerce commission is simply that it insists that the railroads remedy an inexcusable situation themselves or else the commission will take jurisdiction.

ATLANTA DEALER KILLED

Atlanta, Ga., Oct. 28—H. Vincent Connerat, manager of the Atlanta branch of the Buick, was killed tonight while trying to cross in front of a Central of Georgia train. The accident occurred between Jonesboro, Ga., and Atlanta. Mr. Connerat, riding alone in his car, was returning from Macon, Ga. The road and the track parallel for most of the length and Mr. Connerat, who was a daring and none too careful driver, had been racing the Central Flyer. An abrupt crossing, which he must have forgoten, left him with only the alternative of taking a fence or crossing the track. He tried to make the crossing but despite the fact that the engineer put on brakes the engine struck the car square in the middle, lifted it and then dropped it under the wheels. The train went half a mile before it was stopped. Mr. Connerat leaves a wife and two children. His body was buried in Savannah, his old home.

CANADIAN CONCERN SHOWS PROFIT

Toronto, Ont., Nov. 2—The annual meeting of the Russell Motor Car Co., of Toronto, developed no new features of particular moment. While an increase of dividend on the common stock has been expected for some time, no action was taken along that line. The company at present pays 7 per cent. The annual report, which showed net profits of $10,127, was unanimously adopted. The old board of directors was re-elected as follows: J. N. Shenstone, president, Toronto; T. A. Russell, first vice-president and general manager, Toronto; E. B. Ryckman, second vice-president, Toronto; George A. Cox, Toronto; Lloyd Harris, Brantford; J. W. McConnell, Montreal, and A. E. Ames, Toronto.

Because of Ill Health George Schebler Quits Carbureter Business

INDIANAPOLIS, IND., Nov. 4.—Frank H. Wheeler has bought out the interest of his partner, George M. Schebler, in the firm of Wheeler & Schebler, manufacturers of the Schebler carbureter. The business will be continued by Mr. Wheeler without change in firm name, Mr. Wheeler to be sole owner. The consideration has not been made public.

The growth of the company, which has been conducted as a partnership, has been almost phenomenal. Mr. Schebler, who was a mechanic in moderate circumstances, brought out the Schebler carbureter and found himself without sufficient capital to develop and manufacture his invention. Mr. Wheeler became associated with him, and the two started in an extremely modest way in small quarters on the second floor of a building in North Alabama street.

In a remarkably short length of time the business had outgrown its quarters and it was found necessary to erect the enormous plant that is now operated on the south side of the city. This plant is said to be one of the largest of its kind in the world.

Mr. Schebler has been obliged to retire from the firm on account of ill health. He may devote most of the next few months to traveling, in the hope of improving his health. His physicians have advised him for some time that he must retire from business. His final decision to retire was made only last week and his offer to dispose of his stock was taken by Mr. Wheeler, who realized the state of Mr. Schebler's health.

CRUDE RUBBER MARKET

New York, Nov. 4—Crude rubber was easier again in the world's markets during the past week. The price level sagged to a basis of $1.01½ for up-river fine and was steady in the plantation grades, pale crepe standing at $1.02½. While actual sales amounted to practically normal volume of business there was little selling pressure and less active bidding. Receipts continue to increase from both plantations and indigenous fields.

INDIANA S. A. E. ELECTS WEIDLEY

Indianapolis, Ind., Nov. 4—At the first of the winter meetings of the Indiana branch of the Society of Automobile Engineers, held in Indianapolis on the evening of October 31, officers for the ensuing year were elected as follows: George A. Weidley, Premier Motor Mfg. Co., chairman; Herman G. Deupree, Remy Electric Co., secretary, and Chester S. Ricker, Henderson Motor Car Co., treasurer. The topic of the meeting was self-starters, the speakers being W. G. Wall, of the National Motor Vehicle Co.; W. E. Raiguel, of the Ignition Starter Co.; Chester S. Ricker, of the Henderson Motor Car Co.; Joseph Lamb, of the Ignition Starter Co.; E. V. Hartford, of the Hartford Suspension Co.; Charles Crawford, of the Cole Motor Car Co., and Howard Marmon, of the Nordyke & Marmon Co.

S. F. EDGE RETIRES

London, Oct. 24—The English motor industry was surprised today by the announcement that S. F. Edge, one of the most prominent manufacturers in Great Britain, has sold his interests in S. F. Edge Limited to D. Napier & Son Limited, and that he has relinquished his executive position with S. F. Edge Limited. H. T. Vane, who has been associated for many years with Mr. Edge, succeeds him as managing director. No reason is given for the move nor does Mr. Edge state what he intends doing in the future, but it is thought he will not be identified with the motor industry hereafter.

SITUATION IN CALGARY

Calgary, Alta., Nov. 2—Eighteen months ago, when Calgary, Alta, had a population of 50,000, it boasted of having more cars per capita than any other city in the world. At that time there was one car for every nineteen families in the growing city. With a population now of 71,000, and growing at the rate of 1,000 a month, Calgary again bids fair to regain the honors it held 18 months ago. Almost every day sees arrivals of new cars in the city and the local dealers have found themselves unable to cope with the demand. Practically every important make of car in the United States and Canada has now an agency in Calgary. Several large new garages have been opened within the past month and others are under construction. Many believe that there will be too many garages in the city in a short time. A year ago there was a great demand for garage space, but too many have entered the business.

ATLAS SECURES HALTENBERGER

Indianapolis, Ind., Nov. 5—James W. Lyons and his associates who recently purchased the Atlas Engine Works, have engaged J. Haltenberger as engineer. Plans for the output of the coming season have been matured. Sample Knight engines now being shipped are of the four-cylinder type, with a bore of 4½ inches and a stroke of 5½ inches. The factory is getting ready for the manufacture of six-cylinder samples, of the same bore and stroke to be followed by smalled fours and sixes. The Hoosier plant will turn out 4,000 motors for 1913.

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Road Racing and Its Lessons

THIS week Motor Age publishes its annual review of the contests for the 1912 season, in accordance with a practice it has followed for several years. The review this time is not so favorable so far as the American industry is concerned as it has been in previous years. For the first time a foreign car is labelled the national victor, and the champion driver is one who has every right to be claimed as an American because of his many years on the American track, although of foreign birth.

THAT a foreign product has carried off the premier honors cannot be overlooked by the American maker in spite of the fact that a 45-per cent tariff wall exists and the further fact that the American selling organization of many of the European products is confined to but a very small portion of the American continent. The European car has proven its superiority in road events. The grand prize, the Elgin, the Vanderbilt, Santa Monica and Tacoma races have been carried off by foreign machines. America has to content herself with victories on the track and in the smaller events, those of piston displacements under 450 cubic inches.

THE contest play, as it has been staged during the present season, up to the final fall of the curtain, has not been the most advantageous advertisement to the American industry. Although the dollar-and-cent loss because of foreign victory is not dangerous, nevertheless it shows superiority of construction in special racing machines over that of the American maker, who has set out to build his special speed creation with the aim of eclipsing the foreigner. It is true that only three foreign makes have taken a part in the major portion of the play, but it is true that all three have made good by showing their ability to stand up and their rights to speed laurels. Balanced against this has been a divided American industry so far as its attitude towards contests is concerned. The major portion of the industry is opposed to racing, opposed to touring tests and opposed to contests in general. Those who have gone into contests have represented two wings of an industry, one desiring to hold as closely as possible to stock construction with the aim of generally benefiting its product; and the other setting out to create special racing machines with the hope of developing greater speed and endurance than any other machines, foreign or domestic.

THE maker who depended on his stock-type machine placed his only hope in reliability—ability to go the distance at a creditable speed. The maker who went into the freak car construction generally reaped a harvest of barren regrets—aiming to incorporate too many ideas into his machines and meeting with failure at many turns. Between these two wings has been the happy medium, the maker who set out to develop a special racing machine along rational lines of design, but aiming at higher speeds by refinements in construction and attending to the best features of design.

OF these three elements in the American industry, the maker who has kept close to the stock line and the maker who has set out to build a rational machine on refined lines have come out best in the total season. Their machines have given a much better account of themselves. The builders who have developed freaks have lavished money to the four winds and reaped humiliation. Those who want to bring out something new and marvelous must take lessons from the foreigner, who, when bringing out a new type of racing machine, drives it over the roads of Europe for several thousand miles before its speed ability is ever tested. This done, it is returned to the factory and taken apart piecemeal. Every part is gone over with the utmost accuracy to see if the machine has the neeessary stamina to even withstand the ordeal of rough touring. If it satisfactorily withstands this treatment it is re-assembled and given its months of speed workout before it is even considered to enter it in a big speed event. After all of this preparation, these new cars often develop weaknesses in the first few contests and have to undergo minor changes, but the general result is that the design possesses many merits and is eligible for continuing from season to season with ever increasing good results. There is shown to be a definite purpose in the design, incorporating principles of construction that will give excellent results for many years to come.

IN contrast with this are several examples in the American racing history in which tens of thousands of dollars have been dumped into the racing pot and not a shadow of permanency to exhibit for it. The companies engaged engineers, who went off at tangents, worked along unknown lines, produced failures from which there was scarcely one point of real value obtained. This is expensive contest experience. It is unnecessary contest experience. It is foolish contest experience. It is experience that leaves you further back at the end of the season than you were at the beginning. It is experience that wrecks public confidence and also goes far to wrecking factories.

THE lessons of racing are not all learned. Every road race has much in store for the manufacturer who goes into it to develop his product and try out the latest that his engineering department offers. Unfortunately many makers think the winner is the only one to benefit from the contest. This is far from the truth. Every race contestant who gives a reliable performance gains prestige and makes sales. Thousands and tens of thousands who witness road races would not want a car as speedy as the winner. They are looking for the reliable car, for the consistent performer—in a word, the car that can start, go the entire distance and finish without trouble. So long as racing continues will this value continue with it; and so long as racing continues, so long will makers competing learn valuable lessons providing they make the racing program a department of the factory, the same as the laboratory, the final testing and the special testing and make a study of racing.

MOTOR AGE hopes that 1913 will record more sensible participation of American companies in road racing than has 1912. Some of the companies have been specially sensible this season, but the average is low. Already the biggest race for next season has been limited in piston displacement; this augurs well for a rational season. Let the makers be sane in their programs. It is not necessary to be all hog or nothing. There is good opportunity for a limited participation in racing events in this country by a score or two of makers.

Is Motor Organization of Great Merit

Scottish Automobile Club Is Well Worthy of Emulation in America

By George W. Gaidzik

LONDON, Oct. 25—If every state in the United States had one motor car organization like the Scottish Automobile Club, what a boon to the motorists of the country they would be. The Scottish Automobile Club is the controlling body on all matters relating to the motor car movement in Scotland. Its objects are to promote, encourage and develop the motor car movement in Scotland, and to afford means of organization, information, advice, assistance and protection in matters pertaining to motor vehicles and the movement in general.

Of course there is hardly a state in the union which cannot boast of perhaps even several such organizations; but for thoroughness in carrying out the club's objects, there is none whose scope and activity excels that of the Scottish organization. Nor is the Scottish club the greatest organization of its kind in Great Britain, for it is only a little brother to the Royal Automobile Club of London. Being smaller but almost equally effective in its work, it should serve as a better example for other organizations working along the same lines.

The Scottish Automobile Club provides a commodious and comfortable but inexpensive club house in Blythswood square, Glasgow, with the usual social and culinary accommodations, and a motor house adjoining for the storage of members' cars. Each member receives weekly, post free, a copy of the Royal Automobile Club Journal, and annually, free of cost, the S. A. C. Year Book and the Royal Automobile Club Year Book, giving thorough information as to hotels, repairers, touring, etc.

The club affords all possible information and facilities for touring at home and abroad. The foreign customs arrangements known as the tryptique are available to members, and under agreement with the Royal Automobile Club the services of the continental agents and organizations are always at command.

It issues, under warrant from the king's secretary for Scotland, international traveling passes. It controls the recognition and appointment of hotels and repairers in Scotland on behalf of motorists in general; and it undertakes the erection of caution and direction posts where such are deemed necessary.

The club also affords free legal representation in any sheriff court in Scotland, and in any police court in England, Wales and Ireland, on the hearing of any summons arising under the motor car acts or regulations relative thereto. It gives free legal advice on matters relating to the motor car movement, and consideration proceedings in connection with the use of motor vehicles where any principle of general interest or application is involved.

The club has, in the interests of its members, undertaken and lent financial assistance in several important appeals to the court of judiciary, which is equivalent to the American supreme court, and has been the means of obtaining various decisions of great value and importance to motorists. It has appointed solicitors in various centers specially qualified to deal with motor matters, who act on behalf of members on specified terms. It represents motorists at all inquiries held in Scotland under the motor car act of 1903, a Scottish motor car law not unlike our own, and at other proceedings before any authorities in Scotland where the interests of motorists or of the movement are involved.

The club has been instrumental, in negotiations with public and local authorities, in obtaining many privileges for its members, and has done useful work in securing the improvement of roads and hotel accommodation throughout the country.

The organization has been active in its efforts to insure the careful driving of cars and the suppression of the inconsiderate driver. It cultivates reciprocal relations with kindred institutions, and is associated under treaty with the Royal Automobile Club. In fact, the Scottish Automobile Club is the administrative portion of the Royal Automobile Club in Scotland, and every member is, ipso facto, an associate of the Royal Automobile Club, and entitled to the use of club rooms in London set apart for the use of such.

It has a list of correspondents throughout the country who keep the general committee of the club advised on all matters relating to the movement throughout Scotland. It conducts examinations in Scotland for proficiency in driving and mechanical knowledge, and keeps a register of motor servants.

Under a special arrangement with the Car and General Insurance Corporation, members are entitled to a special S. A. C. policy and to a rebate of 10 per cent from premiums for the insurance of their cars. Its membership is situated in and representative of all parts of Scotland; and it controls in Scotland all trials and competitions of motor vehicles.

The S. A. C. Year Book is published by the club with the primary object of affording a ready and concise means of information to members of the club on matters relating to motor car operation and touring in Scotland; and though it is intended on numerous matters to be supplementary only to the more comprehensive and complete information contained in the R. A. C. Year Book issued by the Royal Automobile Club, and which also is supplied to each member of the club, the R. A. C. Year Book is one of the most valuable little publications of its kind in existence.

This book contains: Memorandum relative to the work of the club; lists of office bearers and members; the constitution and bylaws; information regarding the advantages and cost of the club membership emblem and badge; form of application for membership to the club; complete details regarding the cost and means of obtaining driving certificates and certificates for mechanical proficiency; information as to the use of the registration of motor car drivers in the employment register, which is kept by the club secretary, of motor car drivers open for engagement; a list of the objects of the commercial vehicles department of the club; and a page of excellent information on courtesies and rules of the road, which are recommended by the club with a view to engendering good feeling on the part of the public to motor cars and motor cycles.

The publication also contains illustrations and a description of the club house; full information as to the use and facilities of the various departments, house rules, associates' headquarters in London, and a complete list of the maps and books in the library.

Record Show at Olympia

LONDON, November 6—(Special Cablegram)—Olympia show will be the greatest motor trade exhibition the world has seen. Every available foot of space is utilized and the value of exhibits amounts to $1,250,000. Many notable importing firms are squeezed out. There are 353 exhibitors, a record number, in car section, 119 in carriage section, 35 in components and accessory section, 150 in tire and wheel section, 39 in motor press, 8 in motor associations and 2 in car section. Great Britian has 45 per cent of exhibit, France 23 per cent, Germany 10 per cent, Italy seven per cent, Belgium six per cent, United States six per cent and Switzerland and Holland 3 per cent.

Phoenix Winds Up With a Track Meet

Tetzlaff in a Fiat Hero of Racing on State Fair Grounds Oval, Lowering Arizona Mile Record to :51 4-5, Which is Later Beaten by Oldfield

HAMLIN, WINNER OF LOS ANGELES-PHOENIX ROAD RACE, AND HIS FRANKLIN

HAMLIN'S FRIENDS CELEBRATING HIS VICTORY

PHOENIX, Ariz., Oct. 31—This has been a great day for the Fiat at the Arizona state fair grounds. Driving one of the Italian machines of 120 horsepower, Teddy Tetzlaff lowered the Arizona mile record for a circular dirt track from 52⅗ seconds to 51⅘. Tetzlaff also won the principal race of the day, a 50-mile event, while George Hill, driving another Fiat, was second. Hill won the 15-mile free-for-all handicap, in which Tetzlaff was not entered. There were no Fiats in any of the other events and that car finished the day with a perfect score.

The other entries in the 50-mile race were the Cadillac, driven by Charles Soules; Cino, by Lou Heinemann; and Benz, by Fred Meloane.

A steering knuckle broke on the thirty-second mile and the Cino went through the fence, smashing one wheel but not overturning. Heinemann was badly shaken up but not injured. This accident gave Tetzlaff the lead and he held it to the very last. From start to finish he drove a careful race. At the finish he was fully 3 miles ahead of the other Fiat. The total time of each car follows: Tetzlaff's Fiat, 51:51; Mill's Fiat, 54:03; Cadillac, 58:10; Benz, 59:07⅗. This race was a free-for-all for cars having a piston displacement of more than 300 inches.

Ed. Swanson, in a National, was an easy winner of the 10-mile event for the cars in the Los Angeles-Phoenix race having a piston displacement of more than 230 inches. G. M. Floersheim was second in the Schacht; Charles Soules, third in the Cadillac; W. W. Bramlette, fourth in a Cadillac. The National's time was 15:58⅕.

CHARACTERISTIC STRETCH OF LOS ANGELES-PHOENIX COURSE

There were only three cars in the 10-mile handicap, open to all cars in the race from Los Angeles. Soules' Cadillac was given 30 seconds handicap, the Schacht 20 seconds, and the National started from the scratch. Soules drove a careful, consistent race and won with ease; time, 10:44. The cars finished the race in the order of the start.

Three cars started in the 15-mile handicap. Soules' Cadillac was given 40 seconds, while the Benz and Hill's Fiat started from the scratch. The Benz got away ahead of the Fiat but was passed in the fifth mile. They finished as follows: Fiat, 15:57; Benz, 16:03; Cadillac, 16:08⅕.

During the afternoon Ralph Hamlin appeared before the grand stand in the Franklin with which he won the Los Angeles race, and did an exhibition mile in the air-cooler.

Oldfield's Fast Mile

Phoenix, Ariz., Nov. 3—Driving the Christie, Barney Oldfield yesterday made 1 mile in :50½ on the Arizona fair track, the new circular track record for the southwest, previously :51⅘, set by Tetzlaff Thursday. Oldfield's performance was a remarkable exhibition of recklessness. He went on after the horse races and the track was not even sprinkled.

Milwaukee Struggles With Deficit

Scheme Evolved to Secure Extension of Credit to March 1—Creditors Reported to be Signing Agreement — DePalma Discharged from Hospital

ONE OF THE HAZARDS OF THE LOS ANGELES-PHOENIX COURSE

CAMPBELL, WINNER OF SAN DIEGO-PHOENIX DESERT RACE

MILWAUKEE, Wis., Nov. 4.—A plan whereby every creditor of the Milwaukee Automobile Dealers' Association, promoter of the 1912 international road races at Milwaukee on October 2, 3 and 5, will be paid dollar for dollar, is now being brought to consummation by the association's committee in charge of financing the $43,000 deficit incurred by the conduct of the speed carnival.

The basis of the plan is to extend the time of payments until March 1, 1913, and the arrangement is contingent upon the acceptance of it by at least 90 per cent of the creditors. In the meantime the association will be able to earn sufficient funds to cover the entire deficit, it is stated. The annual motor show will be held under auspices and management of the M. A. D. A. some time in January and is always the source of a neat profit, which will be applied to the general funds to cover the indebtedness.

Creditors have received extension agreement forms to fill out and mail to the offices of the association without delay and the plan will become operative if 90 per cent of the claimants come forward. The agreement reads as follows:

Representations having been made to the undersigned as creditor of the Milwaukee Automobile Dealers' Association that said association, as the result of the road races recently held by them in Milwaukee, have liabilities far in excess of their ability to pay; and,

Whereas, if a pro rata settlement to all creditors of said association were made at the present time the same would result in an exceedingly small dividend to creditors; and,

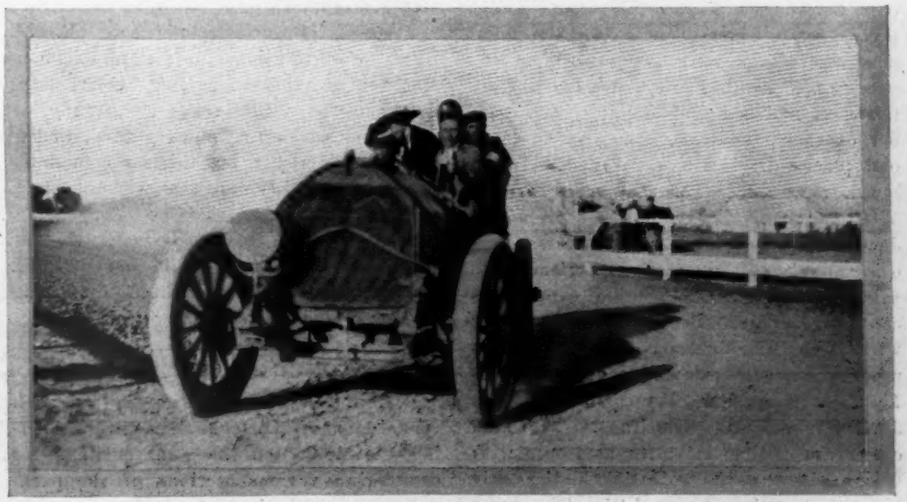
Whereas, representation has been made to the undersigned creditor that said Milwaukee Automobile Dealers' Association have plans in mind, which, if carried out during the next few months, are likely to result in profit to said association, which, together with other funds which they may be able to raise, will enable said association to make a substantial, if not a full, payment of their obligations at a subsequent date;

Now, therefore, the undersigned, in consideration of the mutual promises hereby made, do hereby extend the time of payment of the amount due from said Milwaukee Automobile Dealers' Association to the undersigned respectively to the amount set opposite their several names until March 1, 1913, and hereby agree to take no action or legal steps or proceedings of any kind whatsoever against said Milwaukee Automobile Dealers' Association, or any of its debtors, upon said account until after March 1, 1913.

This extension shall be valid and binding upon the undersigned only upon condition that 90 per cent in amount of the present indebtedness of the association is so extended.

Judging from the signed agreements already returned to the association, the plan is meeting with the favor of a large number of creditors, who thereby indicate their desire to take a chance at getting all of their money in a few months from now rather than get a small percentage at once. The association feels confident at this time that the required 90 per cent will affirm the agreement.

So much confidence is displayed in the ability of the association to pay its claims in full by March 1, or thereabouts, that in proceeding with its plans for the annual show there seems to be met no hesitation to give credit on materials and supplies, leases and rentals and other requirements to make the show a success. Of course, it will not be necessary to go outside of Milwaukee for such things, which may be fortunate for the reason



STEVENS-DURYEA THAT WON THE SAN DIEGO-PHOENIX DESERT RACE

Protects Penn's New State Road System

that the association has not achieved too good a standing in the outside world so far as future credit is concerned.

Ralph de Palma winner of the Vanderbilt cup, and seriously injured by collision with Caleb Bragg's Fiat near the finish of the last lap of the grand prix, was dismissed from Trinity hospital as permanently cured at the end of last week.

MOROSS EXPLAINS MILWAUKEE

Chicago, Nov. 2—E. A. Moross, manager of Bob Burman, in a letter written from Indianapolis, denies that his bill for expenses turned in to Milwaukee for the participation of the Moross string in the road races was exorbitant. He declares that so far he has not been able to collect a cent from Milwaukee, that his expenses, which he states were promised him if he remained over to the postponed date, were legitimate and in keeping with the situation as explained to him by the promoters, and that if the dealers promote the 1913 meet he will not make an entry. He states that he was given a receipt in full for his entries, which were alleged to have been paid by a German hardware concern which desired to have the Benz in the meet. His hotel expenses totaled $371 and his garage bill was $100, which later was adjusted by the Kissel agent who runs the place. In the layover for the postponed meet Moross states he was compelled to retain his rooms at the Plankinton while he was in Pittsburgh and St. Louis—4 days in all—because the demand for rooms was so great he feared he would be unable to get accommodations in case he gave up his quarters.

RACE RESULTS AT SALEM

Salem, N. H., Nov. 2—The uncompleted program of motor races which were originally scheduled for October 12 at Rockingham park race track was run off here Tuesday when the Boston dealers who had cars entered conducted the events under their own auspices, no admission being charged. There were five events on the program. The first were the 1-mile time trials in which Harry Grant, twice winner of the Vanderbilt, won first and second places driving two Stutz cars, making a new record for the track here of 57⅘ seconds. Harry Cobe, driving a Jackson car won the 10-mile race with another Jackson driven by Charles Basle taking second. The 25-mile event was captured by Jack Le Cain driving a Stutz with Cobe in a Jackson second. The 20-mile match race between Grant in a Stutz, Le Cain in another Stutz and Basle in a Jackson was won by Grant. The final event was a time trial for amateurs with George Downs in a National, the only entrant, his time being 1:05. The races were well attended.

Governor Tener Refuses to Permit Trolley to Encroach on Highways

PITTSBURGH, Pa., Nov. 4—Governor Tener, of this state, has taken a position in which he shows himself the friend of the motorists and of others who make use of the new state road system. He refused last week to grant a charter to a street car company which has, as part of its line, a part of the state road taken up. This road system which will cost more than $50,000,000 when completed, will be one of the finest in the country. It will cover more than 8,000 miles. The governor stated, in refusing to give up part of one of the roads to the company asking for a charter, that he would take the same action regarding existing companies which wanted to extend their lines.

Under the corporation laws of the state, the governor has to pass on all charter grants to railroads, street railway lines and extensions. No line is allowed to begin work without the permit containing the signature of the governor. Many, both motorists and street railway men, have been watching the governor closely to see what action he would take with this first case of the kind. The state highway department has also been vitally interested in the action of the governor and has been quietly working to preserve the roads for all traffic but street cars and railroads.

The governor takes the position that no trolley line will be allowed to use the new road system or any part of it, as these lines, like the railroads, because of their rapid development, will soon be running on their own rights of way. He also contends that the demand for speedier transportation makes it impractical for cars to use the roads where other traffic also must go.

State Highway Commissioner E. M. Bigelow, of this city, does not believe in the car companies getting their lines down on the public roads as already, in many cases, the roads are graded, underdrained and ready for the car companies to lay their rails and ties without much trouble. He states that as the people's money was used to do this work, the car companies should not get the benefit. Mr. Bigelow also contends that the running of heavy cars would destroy the roads.

BOSTON DISCUSSES PARKWAY

Boston, Nov. 2—The metropolitan park commission of Massachusetts gave a hearing Wednesday on the plans outlined for completing various sections of the parkways for which the last legislature appropriated $200,000.

As a result of the hearing motorists have had it called to their attention again that the most important section of parkway necessary, and for which nothing has been done, is a section that would connect Boston with the Mystic valley and Revere beach boulevards leading to the north. So a movement has been started to bring about some sort of action toward compelling either the state or some of the cities to do something. These two boulevards are admittedly the best in the state, but there is no direct approach to them from Boston.

The plan now about to be agitated is to have a parkway made in Cambridge connecting with Commonwealth avenue in Boston, and going either across by the stadium to Harvard square or along the Cambridge side of the Charles river, passing Harvard college and then swinging down Washington street to Union square, Somerville and over the hill to the boulevard.

BOOM COAST-TO-COAST ROAD

Ottawa, Ont., Nov. 2—The Ottawa Valley Motor Association has decided to turn in and help in the plan for a coach or motor road from the Atlantic to the Pacific. The work will cost considerable and will take several years to complete, but the plans for its building are now well under way. As the road will pass through many provinces and cities, a great deal of legislation will be necessary for its building and it is in this way that the Ottawa association can be of assistance. As this city is the capital, the local association likely will undertake to assist the parent association in getting their legislation through.

MASON WINS A CENTURY DERBY

New York, Nov. 5—Before a crowd estimated at nearly 18,000 a program of races was given at Brighton Beach on election day, the feature of which was the election-day derby at 100 miles, won by Mulford in a Mason. This brought out a ponderous field of thirteen starters and reached out so far that darkness fell during the last third of the distance, causing the finish to be drawn in the dark.

The Mason pair finished the full course and were awarded the two chief purses; Wishart's and Pullen's Mercers came next with ninety-eight and ninety-five laps respectively. Minkers' Kilne covered ninety-two laps and the LeCain Stutz made ninety. Costellos' G J G was still running at the end, but it was several laps behind the Stutz.

The race developed a number of mishaps and while nothing should detract from the honors won by the Masons, the Stutz driven by Dave Lewis was eliminated at a fortunate point for the winners. The same may be said for the National and two

Bay State Expects a Fixed-Speed Law

of the Mercer cars beside the ones that were placed.

The start was delayed about 30 minutes too long and the field was too large for the course, but fortunately no fatal accidents marked its running. At the end of the first 10 miles, the National led, with the Stutz pair close up. At 20 miles the LeCain Stutz showed in front with Thebaud's G J G second and the Ferguson Mercer third. At 30 miles the Lewis Stutz was out in front, running swiftly and steadily. His teammate was second and the G J G third. The LeCain Stutz blew a tire on the first turn and lost two laps, the G J G and Mercer, Ferguson moving up a peg. Whalen went over the embankment in the thirty-first mile, breaking the wheel of his National and putting it out of commission. Whalen and his mechanic were shaken up but not seriously hurt. Then the Lewis Stutz turned over at the head of the stretch, bending its front axle and eventually putting it out.

The last 30 miles were run in the growing darkness and the finish found the steady-going Mason at the head of the procession. Throughout the race both cars were prominent but not in the first flight. They suffered little tire trouble and the Mitchell Mason was in front until near the end, when Mulford came along and wrested it from his teammate. This meet marked Mulford's first appearance on a Mason.

The record was not disturbed owing to the caution necessary in the latter stages. The policing was inadequate to handle such a large crowd. It is estimated that 1,200 cars were parked at the track. Summary: cars were parked at the track. The meet was well handled and there was not a whit of criticism as to the quality of the sport furnished by the promoters. Summary of the races:

Ten miles for cars under 301 cubic inches—Stutz, Lewis, won; Mercedes, Wishart, second; National, Whalen, third. Time, 9:17.50. Also ran: Mason, Mulford; Stutz, LeCain; Mason, Mitchell; Klinekar, Minker; Klinekar, Armsby.

Five miles for cars under 301 cubic inches—Klinekar, Ormsby, won; Mason, Mulford, second; Mercer, Limberg, third. Time, 5:01.20. Also ran: Mercer, Ferguson; Mercer, Pullen; Mason, Mitchell.

Ten-mile free-for-all—Mason, Mitchell, won; Stutz, Lewis, second; Mercedes, Wishart, third. Time, 9:47.55. Also ran: Klinekar, Minker; National, Whalen; Mercer, Ferguson; Mason, Mulford; G. J. G., Thebaud; Klinekar, Ormsby.

One hundred-mile free-for-all—Mason, Mulford, won; Mason, Mitchell, second; Mercer, Wishart, third. Time, 1:42.11. Also ran: Mercer, Pullen; Klinekar, Minker; Stutz, LeCain; National, Whalen; G. J. G., Thebaud; G. J. G., Costello; Stutz, Lewis; Mercer, Ferguson; Mercer, Limberg; Klinekar, Ormsby.

LACROIX TAKES ON MERCEDES

New York, Nov. 4—Paul Lacroix has just signed a contract whereby he becomes the exclusive agent in the United States for the Mercedes car. The contract extends to 1920. The headquarters of the new concern, the Mercedes Distributing and Importing Co., of which Mr. Lacroix is president, are at 1770 Broadway.

Massachusetts Fears Reasonable Limit Clause Will Be Dropped

BOSTON, MASS., Nov. 2—Is Massachusetts going to have a fixed speed law next year instead of the present law that allows a reasonable speed with no limit on the state highways outside of the thickly settled thoroughfares? That is what some motorists are pondering over following the action of the Massachusetts highway commission in placing a 25-mile an hour limit on the road between Nahant and Lynn. There has been some speeding over the road during the summer and as a result action was asked to put a limit on the road.

At first it was proposed to make it 30 miles an hour, but finally it was dropped to 25 miles and the highway commission authorized this limit. In discussing the matter with some motorists Chairman W. D. Sohier of the highway commission stated that the judges in the courts were beginning to interpret 25 or 30 miles an hour as excessive speed and motorists were being convicted of reckless driving for exceeding this limit. This conviction automatically suspends a man's license under the law.

So the germ seems to have been born, that if a fixed speed of 30 miles an hour is established by the state, no motorist can be convicted of reckless operation where he was going fast only, if he does not exceed this limit on the state highways. Therefore it would not be surprising if a bill was sent to the legislature by the highway commission or some one acting for it along those lines.

The commission has a habit of fostering legislation each year now instead of confining its efforts to executive duties. Arguments may be made from both points of view, but a fixed speed probably would be opposed by the majority of the motorists. That the commission has something in mind in the way of legislation is foreshadowed by its invitation to the directors of the Massachusetts State A. A. to meet the members of the commission and talk over motor affairs for future action.

SPEARE AGAIN CHOSEN

Boston, Mass., Nov. 2—The annual meeting of the Massachusetts State A. A. was held in Boston on Thursday. The directors reelected President L. R. Speare, of Boston; Vice-president J. P. Coghlin of Worcester and Secretary-treasurer James Fortesque of Boston. The legislative committee reported that twenty-five bills inimical to motor legislation were killed at the last session of the Massachusetts legislature and that the state association did much to bring about this result. It is planned to work harder to increase the membership because more legislation of even a more drastic nature will be brought up next year relative to the motor industry.

BIG TIME IN BUFFALO

Buffalo, N. Y., Nov. 1—Eight hundred and forty-six cars, representing an investment of approximately $1,000,000, were assembled at 9 o'clock last night in the 70 acres of parking space surrounding the country club house of the Automobile Club of Buffalo at Clarence, N. Y. The occasion was the club's annual Hallowe'en party, and the attendance, upward of 2,500 enthusiastic motorists, surpassed every known record in this country for an affair of the kind. Victor Roditti, member of the board of directors of the Automobile Club of France, with headquarters in Paris, was among the guests present. Mr. Roditti stated that in all his travels around the world he never before witnessed such an astounding demonstration of the social side of motoring.

SEEKING NEW ROAD MATERIAL

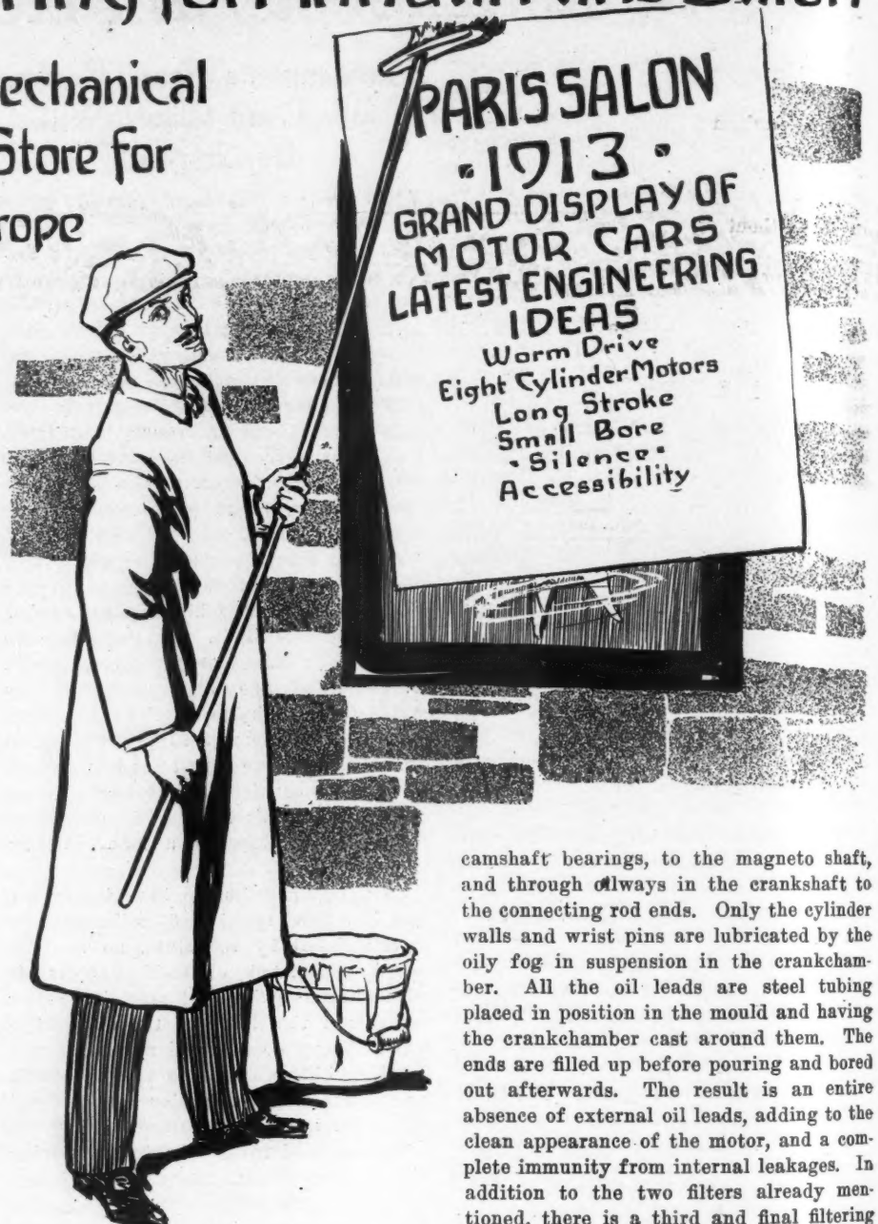
Savannah, Ga., Nov. 2—Chatham county is looking for a new material to be used in keeping its world-famous country roads in condition. The commissioners would be glad to begin early next year putting down a material that could be put in position as cheaply as gravel and wear longer. The roads of the county now cost $300 per mile per annum to maintain, even when they are kept up with convict labor, and this is considered a pretty good paving bill.

Most of the roads in Chatham county are paved for a width of 16 feet. It has been suggested that it might be a good thing to put in a roadway of 12 feet of some more lasting and durable material than gravel. Brick has been considered and discarded because of its initial cost. Asphalt block has also been given consideration, but it has not been adopted so far because of its cost. There is a composition made up of asphalt and small pebble size granite or other stone pieces, but this is not entirely adaptable to this section because of the great distance the stone would haev to be transported. In localities where the stone is easily accessible this style of road paving has been adopted with much success.

It has been suggested that it would be feasible to have a narrow roadway of say 12 feet in the center of the thoroughfare flanked on either side by a good gravel paving. This would give the drivers a road of sufficient width to use for ordinary purposes and the gravel could be employed for the purpose of turning out when one machine or horse-drawn vehicle meets another.

France Preparing for Annual Paris Salon

No Great Mechanical Changes in Store for 1913 in Europe



By W. F. Bradley

PARIS, Oct. 28—Detailed refinements which enhance the silent operation of the car, add to its accessibility, diminish the labor involved in dissembling for repairs, and lessen the attentions necessary to obtain continued satisfactory service will be strong features on next season's French models which will be shown at the Paris salon. So far as can be gathered from close inquiry and inspection before the opening of the shows, there will be few if any radical changes in design, but many alterations in details of manufacture and equipment.

Chapuis & Dornier Motor Unique

Many of the improvements common to most European motors can be understood by an examination of a new motor produced by Chapuis & Dornier, a firm specializing in small high-efficiency motors for the trade. Although valuable in itself, the example is taken primarily because it typifies the general tendency in European design. The motor has four cylinders in one casting of 2.9 by 5.1 inches bore and stroke. The dimensions may appear small, yet it is this size of motor which is being produced in France, and indeed throughout Europe, in the greatest numbers. It is considered possible to get enough power and speed out of a power plant of these dimensions to meet all requirements, whether they be long distance touring with an open body or suburban work with a heavy inside-steering body. In the Chapuis & Dornier the water circulation is by thermo-syphon, but as the motor is designed to be used on various types of chassis the outlet pipe can be mounted with its opening to either front or rear and the inlet can be either at the front or rear. With a radiator in front the rear opening to the cylinder jacket is closed by a bolted-on plate.

The crankchamber is not divided horizontally into two equal parts, but has detachable end plates in which the two main bearings are received and a detachable shallow base serving entirely as an oil reservoir. This method of construction is becoming general for small and medium sized motors, for it is now a very common practice to abolish the center bearing, the result being a lighter and more compact motor. Providing the shaft is properly designed, with bearings of adequate length, there is no whip, nor vibration. Valves are on one side, operated by a one-piece camshaft, and tappets with adjustable heads and springs to maintain them constantly in contact with the face of the cam. Face diameter of the valves is 1.3 inches. One of the best features of this motor is the lubricating system. The base chamber contains about 1 gallon of oil, poured in through a wide-mouth tube also fulfilling the functions of crankcase breather. With the tube is an easily detachable filter, and along the full length of the crankchamber is another fine gauze filter through which all oil must pass on its way to the basechamber, after being forced out of the bearings.

Oil Circulation

A gear type of oil pump in the lowest portion of the basechamber is driven off the camshaft and carries the oil under pressure to the main bearings, to the two camshaft bearings, to the magneto shaft, and through ollways in the crankshaft to the connecting rod ends. Only the cylinder walls and wrist pins are lubricated by the oily fog in suspension in the crankchamber. All the oil leads are steel tubing placed in position in the mould and having the crankchamber cast around them. The ends are filled up before pouring and bored out afterwards. The result is an entire absence of external oil leads, adding to the clean appearance of the motor, and a complete immunity from internal leakages. In addition to the two filters already mentioned, there is a third and final filtering before the lubricant reaches the bearings.

Cast within the crankcase is a tubular oil chamber receiving through its base the main feed pipe from the pump and having a very fine gauze filter surrounding this pipe. The oil coming in at the center has to pass through the filter into the outer portion of the chamber and from there is led through the steel oil leads, already mentioned as buried in the casting, to the bearings. Provision is made for readily withdrawing this filter, for it is placed on the top of the crankchamber just to the right of the magneto, and can be pulled out by removing a couple of nuts. Whatever dirt may pass through the first two filters will be stopped here and can be removed readily on the withdrawal of the filter. The two main feed pipes starting from this filtering chamber have a couple of branches leading to the plain camshaft bearings, and a third one to the magneto shaft. This

removes the necessity for a screw-down grease cup for this organ. The amount of pressure delivered to the bearings can be regulated at will. On the main pipe from the pump to the filtering chamber is the pressure relief valve, which, on opening at a determined pressure allows the excess to return directly to the sump. Usually this value is regulated once for all when the car is assembled and cannot be adjusted without dismounting the motor. In this case it can be withdrawn by the use of a wrench, for it is on the side of the crankchamber just below the magneto coupling. The advantage is that it can be set for a moderate pressure of oil when working under normal conditions and in level country and gives the facility of increasing the pressure to any required degree when the car is about to undertake hill climbing or other difficult work. Even on the roadside the adjustment need not occupy more than 3 or 4 minutes at the most.

Magneto on Round Base

The magneto mounting and adjustment is another good feature. The platform cast with the crankchamber has a concave face and the base of the magneto is rounded. This facilitates the centering of the magneto and also allows variations in timing by merely slackening off the holding down band and inclining the magneto as desired. Further adjustment is provided by the coupling which is a split collar gripping the magneto drive shaft. On this collar being slackened, one shaft can be turned in relation to the other to any required degree. The facility of taking off the magneto and putting it back again without disturbing the timing is retained by reason of the dog teeth at the other end of the coupling. The magneto is the latest Bosch dust- and water-proof type. In this particular instance the general tendency to fit silent-chain drive for the cam and magneto shafts has not been followed. Silent operation is assured, however, by the spring mounting of the pinion on the front end of the crankshaft. The spring mounting prevents all clattering of the teeth even when running slowly on a very weak mixture. As the valve tappets are adjustable, with springs under the tappets to keep the rollers in contact with the cams, the operation of the motor is remarkably silent. Piping has been eliminated as much as possible, the intake passages being cast with the cylinders, thus getting the benefit of the water jacket, and allowing the carbureter to be mounted on the side opposite to the valves. Obviously this gives increased accessibility. The motor has a very high efficiency, for despite its small size it develops 27.75 horsepower at 1,700 revolu- and 21.75 horsepower at 1,250 revolutions per minute.

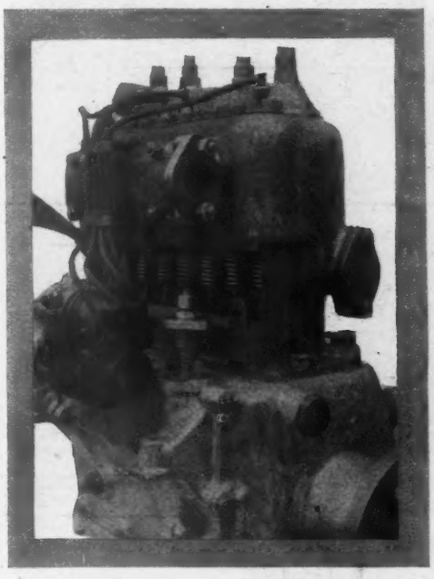
Unic Chassis

Unic has prepared for the coming shows a chassis having a number of interesting features for the owner looking after his own car. The cylinders, 3.5 by 5.1 inches bore and stroke, are a single casting with valves on one side. The peculiarity of the valve mechanism is the provision made for lubricating the springs and the valve guides. The usual covers over the valve stems are made an oil-tight fit, the surfaces being planed up smooth and provision made for screwing them tightly down on their seating. Thus an oil-tight chamber is formed and provision is made for oil to get into it by a hole from the base of this chamber into the crankchamber. As this hole is in the lowest portion of the valve stem chamber, and as the lower front edge of the chamber, immediately in front of the tappet guides, is raised, there is no possibility of the oil getting out, and on the motor being stopped it will all drain back again into the sump.

The system of lubrication is by pressure feed to the main bearings and through the hollow shaft to the connecting rod ends. A silent chain is used for driving the cam and magneto shafts. There is a short chain from the crankshaft to the camshaft, without any means of regulating the tension, and a longer chain from the camshaft to the water pump and magneto, the two being driven off one shaft, the pump being in front of the housing and the magneto to the rear of it, alongside the cylinders. On this chain there is provision for automatically maintaining the tension, for there is a jockey pinion, mounted on the end of a swinging lever and kept on the inner face of the slack of the chain by means of a light spring. This avoids the use of the eccentric generally employed. The motor has no fan behind the radiator, but has vanes on the flywheel.

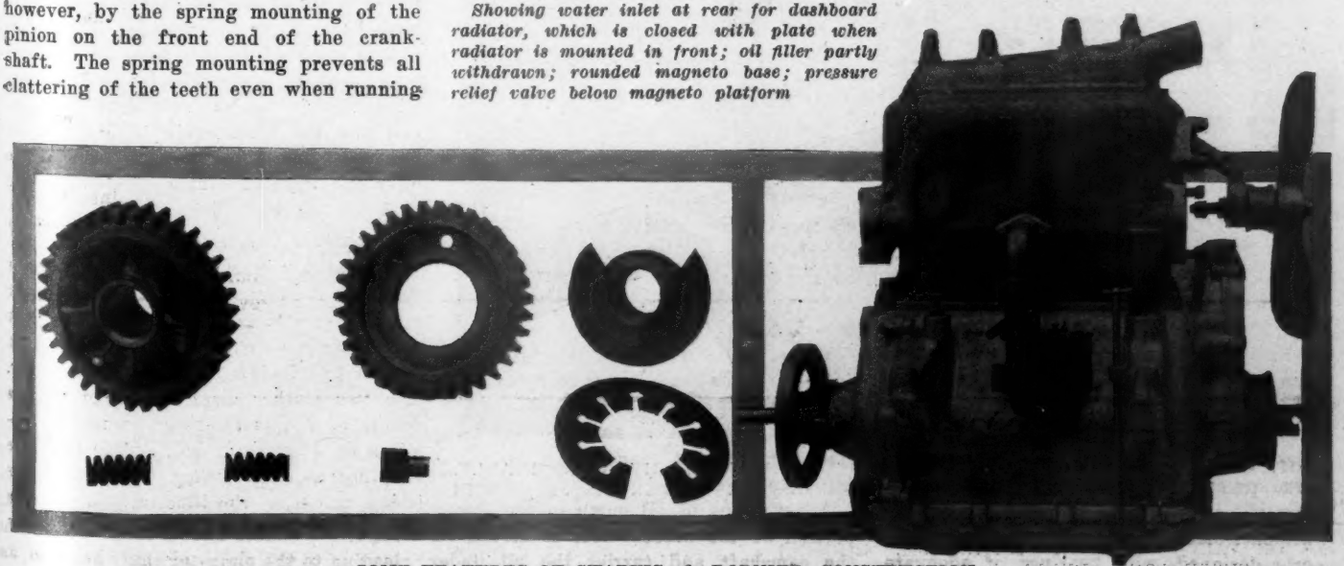
Demountable Fuel Tank

An interesting feature from the standpoint of the owner is the provision for quickly dismounting the gasoline tank. This is carried on the front of the dashboard, its top being so shaped as to harmonize with a scuttle dash and torpedo body. The tank is attached to each of the main frame members by means of a



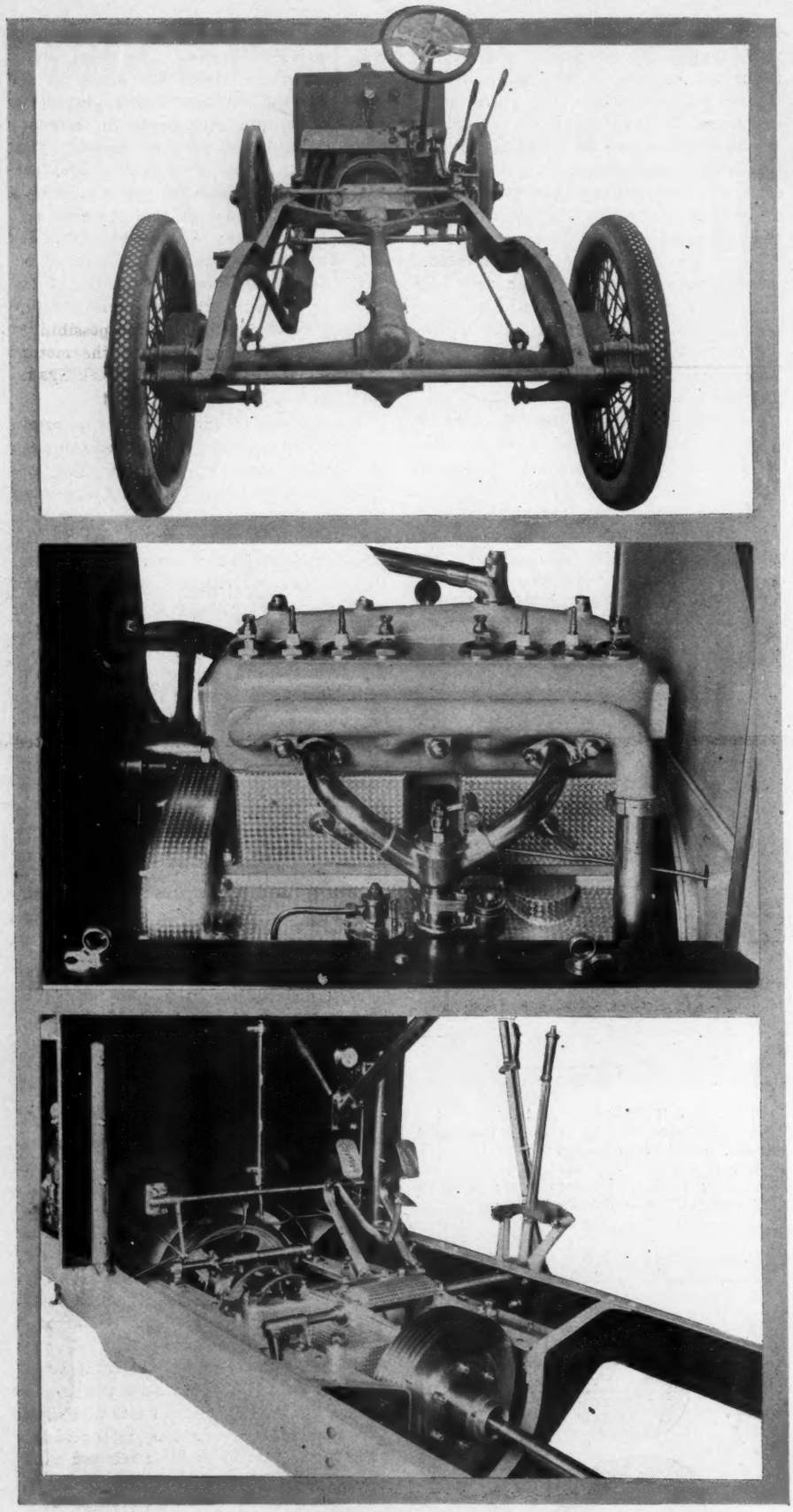
CHAPUIS & DORNIER SMALL MOTOR

Showing water inlet at rear for dashboard radiator, which is closed with plate when radiator is mounted in front; oil filler partly withdrawn; rounded magneto base; pressure relief valve below magneto platform



SOME FEATURES OF CHAPUIS & DORNIER CONSTRUCTION

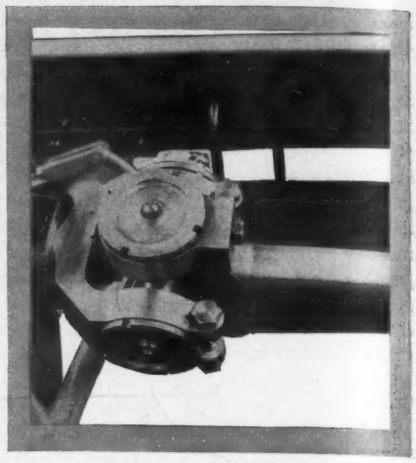
At left, spring drive pinion assembled and in parts. At right, carbureter side of motor, showing the oil filter and adjustment and crankcase breather pipe



TOP, GREGOIRE 10-12-HORSEPOWER CHASSIS WITH WORM-DRIVEN REAR AXLE. NOTE SHAPE OF REAR PORTION OF SIDE FRAME MEMBERS OF THE CHASSIS OF THE GREGOIRE

MIDDLE, UNIC 17-20 HORSEPOWER 1913 MODEL MOTOR SHOWING OIL-TIGHT HOUSING OF VALVE OPERATING MECHANISM. HOUSING AT FORWARD END INCLOSES SILENT CHAIN TIMING DRIVE.

BOTTOM, TRANSMISSION ELEMENTS OF UNIC 17-20-HORSEPOWER CAR, SHOWING RIBBED BRAKE DRUM ON TRANSMISSION BACK OF REAR AXLE



DE DION-BOUTON UNIVERSAL JOINT

In the propeller shaft of the eight-cylinder 26-horsepower model located between the gear-set and enclosed portion of shaft. There is a similar one in front

couple of lugs and a bolt, and at the top is secured by a bolt going through the dashboard. It is mounted around the steering column, but does not interefere with this in any way. One portion of the tank is partitioned off for the reserve oil supply, this oil tank having an upper and lower compartment, and it is only the measured contents of the lower compartment which can be emptied into the sump at one operation. If the tap is left in the open position unintentionally only the measured quantity will drain out; to get another and similar quantity the cock must first be put in the closed and later in the open position. The arrangement prevents idlers emptying the whole of the reserve supply into the crankchamber.

The under protection of the power plant is well worked out. A subframe receives engine, clutch and gearbox, the space between the subframe and the main frame members being covered in by sheet metal. These are fixed in position and through these are passed the exhaust pipe, the water overflow and whatever connections must be made to the outside. The underpan is attached to this fixed portion and is secured at each side by four spring clips; thus it can be dropped off in a second and put back again in a couple of minutes. The shape too, is such as to offer the least amount of resistance and to raise the least dust.

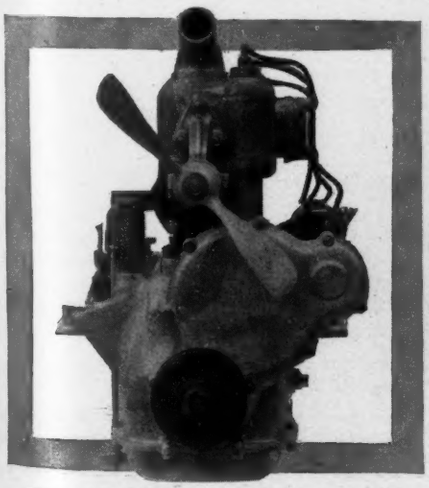
New Leather Coupling

An entirely new feature is a leather coupling between the motor and gear set. It comprises a short hollow shaft with flanges at each end, to each one of which is bolted a stout ring of leather. The two leather discs are faced with a couple of flat metal rings secured in position by a series of bolts. The complete coupling as seen when dismounted, is shown in one of the illustrations. On the clutch shaft are a couple of slightly curved radiating arms, and on the primary shaft a similar pair of arms in the opposite plane to the first pair. The

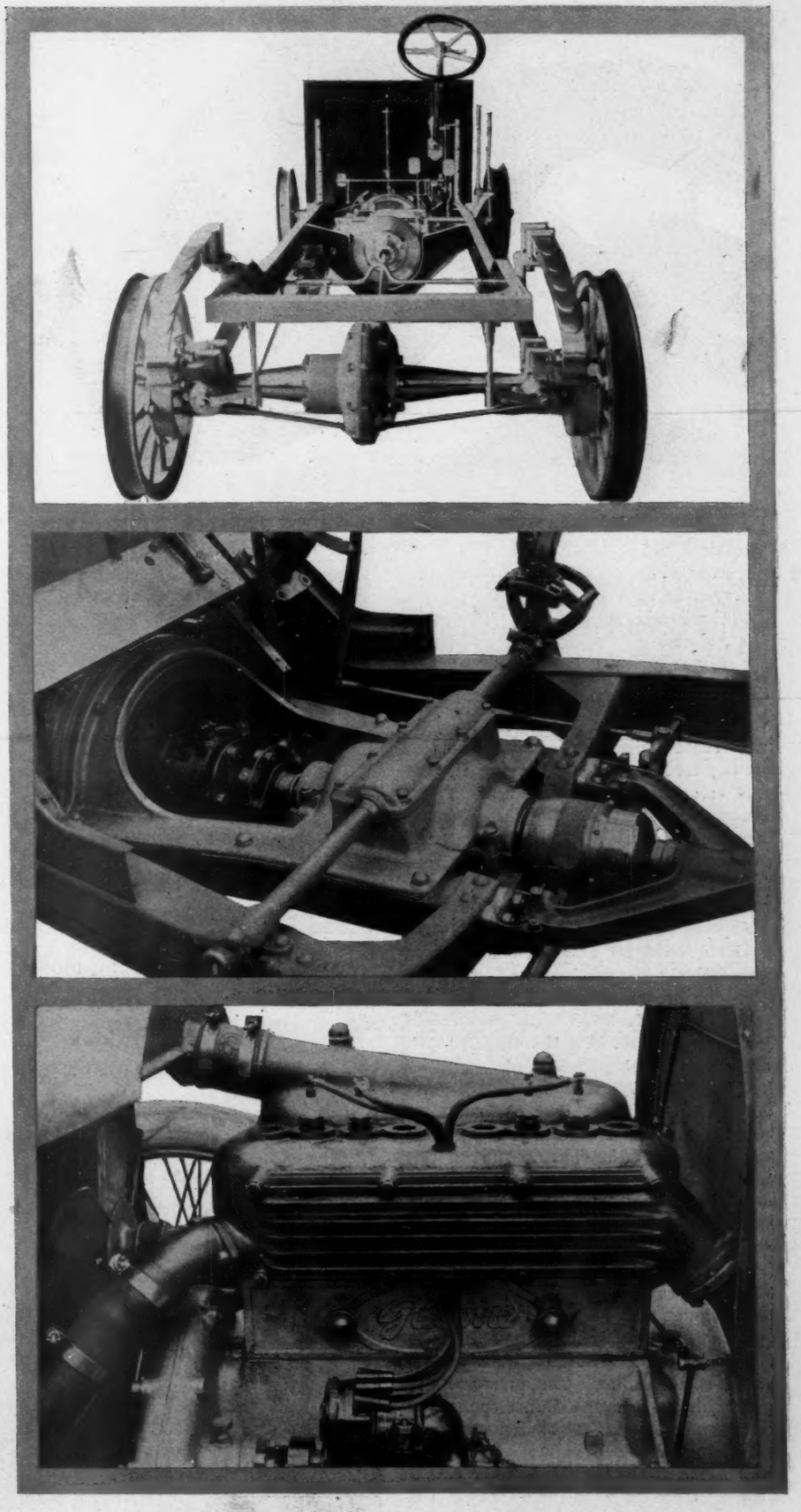
coupling is placed between these two pairs of arms and fastened up to them by means of four bolts—one through each arm. The flexibility of the leather allows the clutch to be withdrawn and also allows for the relative displacement of the two shafts, while the metal rings on the leather give it sufficient stiffness to take the drive. Apart from its ease of dismounting—four bolts only to withdraw—the coupling has the advantage of being silent under all circumstances. A patent is claimed for this construction.

Gregoire has produced for next season a small four-cylinder car intended particularly for light touring or town service. It has cylinder dimensions of 2.5 by 5.1 inches, this being the stroke-bore ratio adopted for the majority of Gregoire cars. Its feature lies in the unit construction of motor and gear box, a design which has not met with very great favor among European constructors despite the lead given by a few important firms. The effort in this case has been to give same accessibility as with the assembled groups while having the compactness of the unit type. A subframe receives the entire power plant. With the crankchamber is cast one half of the flywheel housing and with the gearbox is a cradle and the second portion of the flywheel housing, the two being bolted together to form the unit. The cradle is open and the flywheel, containing the cone clutch, is encircled without being enclosed. In this cradle is a flexible coupling between motor and gearset—it has been considered preferable despite the rigid unit construction—and it is into this cradle that the cone can be withdrawn for dismounting. The motor has no underpan, for the entire space is filled in by the crankcase and gearbox webs, and the space between subframe and main frame is filled by sheet-metal plates.

A silent chain is used for the distribution, the magneto shaft being mounted eccentrically to allow of taking up slack. Chains were adopted some considerable time ago and are now employed on all Gregoire models. Lubrication of the



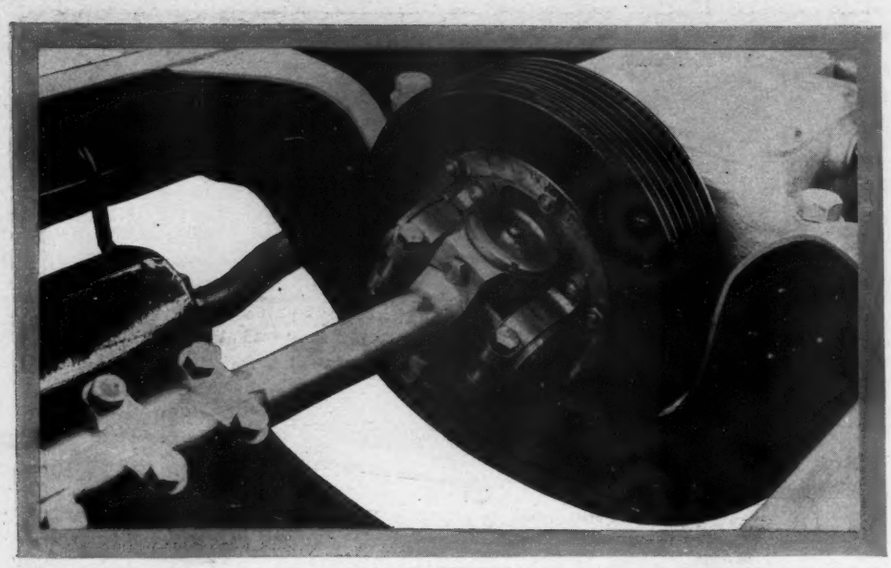
END OF CHAPUIS & DORNIER MOTOR
Aviation type of propeller cooling fan with two blades



TOP, REAR VIEW OF UNIC CHASSIS SHOWING ABSENCE OF TORQUE AND RADIUS RODS. NOTE SHAPE OF CENTRAL CROSSMEMBER OF FRAME AROUND THE TRANSMISSION BRAKE AND SMALL DIAMETER OF PROPELLER SHAFT

MIDDLE, UNIT CONSTRUCTION OF GREGIORE 10-17 HORSEPOWER MODEL. NOTE ACCESSIBILITY OF CLUTCH

BOTTOM, VALVE SIDE OF GREGIORE MOTOR ILLUSTRATING METHOD OF LEADING HIGH-TENSION WIRES FROM MAGNETO TO PLUGS THROUGH THE EXHAUST MANIFOLD OF THE MOTOR



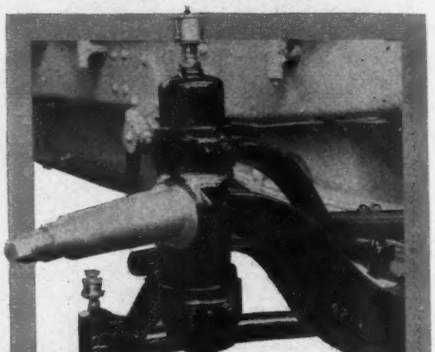
TRANSMISSION FEATURES OF DE DION-BOUTON EIGHT-CYLINDER CAR
Showing universal at front end of propeller shaft and new transmission brakes

motor is under pressure through a hollow crankshaft. The gas passages are cast with the cylinders and the carbureter is bolted up direct to the cylinders without the use of any piping.

This little chassis is provided with an overhead worm drive to the rear axle, the drive shaft being carried in a housing forming torque tube and having its two arms attached to the transverse frame member receiving the end of the subframe. There are no brakes on the transmission, both sets being within drums on the road wheels and operated respectively by hand lever and pedal. The gearset provides four speeds and reverse, in response to the popular demand for an additional gear on comparatively low powered cars. Gregoire is making use of worm drive on some of the large chassis fitted with the Knight sleeve-valve motor. On the other poppet-valve types bevel gear is used.

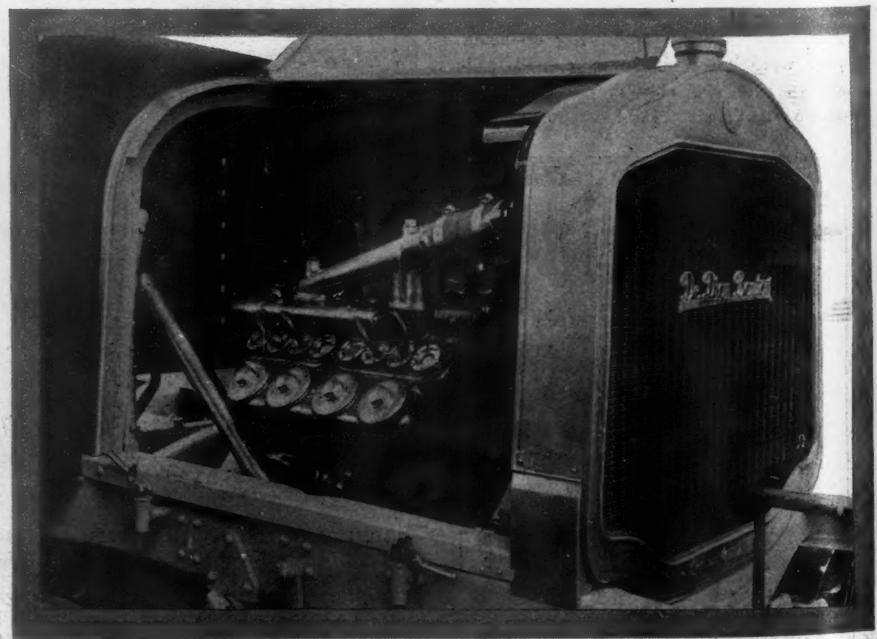
De Dion Eight-Cylinder Car

Comparatively few French manufacturers have adopted worm drive De Dion Bouton is one of the converts, but in this case it is only used for one high-grade model, the other types being fitted with the usual bevel-gear live axle. The worm-driven type is an eight-cylinder of 2.9 by 5.1 inches bore and stroke, being the successor of a car produced last year with a motor having the bore of 2.7. The first type had bevel-driven rear axle. The motor is an interesting example of the use of silent chains. The cylinders are in two blocks mounted V-fashion on the crankchamber, and thus having one camshaft for the sixteen valves. In a separate housing at the front end of the crankchamber there is one chain taking the drive from the main shaft to the oil pump, fully in the base of the chamber, a second chain from the crankshaft to the camshaft immediately above it, then a third one from the camshaft to the ventilator fan. At the rear of the motor is another silent and enclosed chain taking the drive from the camshaft to the magneto and air pump. The crankshaft is carried on two plain bearings and the motor is fitted with light steel pistons.



ADJUSTABLE PIVOT OF DE DION

The final drive has some distinctive features. The rear axle is of the type known as the de Dion transverse cardan system, now abandoned by this firm for all the lighter units. The worm is overhead and from its housing to a tubular transverse member level with the front end of the rear springs is a tube receiving the drive shaft. This housing is bolted to the differential at the rear and at the front and encircles the tubular transverse member already mentioned, this member being secured on the brackets carrying the spring hangers. The portion of the shaft between this housing and the gearbox is exposed; it has a universal joint at each end and is cut in the middle the two halves being united by a heavy coupling, showing in one of the illustrations. Three-quarter elliptic underslung springs are found on this chassis.



THE EIGHT-CYLINDER V-TYPE MOTOR OF DE DION-BOUTON
Cylinders are cast in fours and set at an angle on the crankcase

OUTLOOK IN NORTHWEST

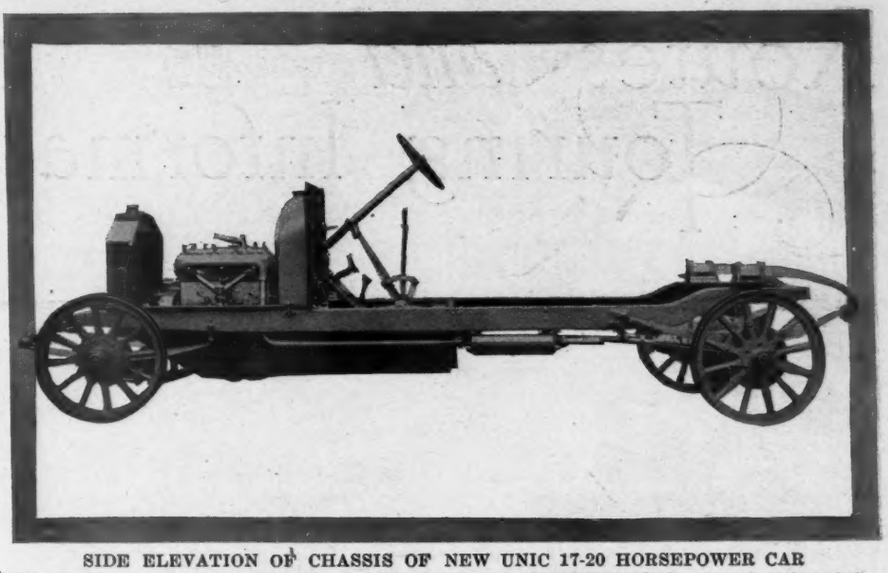
Seattle, Wash., Nov. 2—The volume of business transacted by motor firms in Seattle has taken a great spurt during the last month. One of the surprising features of this year's trade has been the consistent call from the rural and agricultural districts. The farmers are coming strong for gasoline machines now, which situation is due to the big crops and the betterment of highway conditions. Not only in western Washington but on the eastern side of the Cascades the volume of trade has increased by leaps and bounds.

Naturally dealers in low-priced cars are reaping a rich harvest, but the demand is not confined solely to their product. The agents for medium-priced and high-grade vehicles report that their sales records

are far in advance of the 1911 season at this time and in no few instances nearly their entire allotment for the year has been contracted for.

The invasion of a number of new agencies has tended to increase the total sales of the trade throughout the state of Washington, but the old established firms are transacting more business than ever before. There is not a dealer who is not entirely satisfied with the business conditions and there are some who are worrying whether they can get enough machines to meet the demand. This situation coming in the face of orders that at the beginning of the year were considered decidedly optimistic shows plainly the hand of prosperity throughout the Evergreen state.

Wholesale dealers and distributors who have recently made tours of the state to sign up agents and place contracts for cars are a unit in declaring the outlook for a big year for the motor trade never looked better. The great crops have assured the farmers of a big bank roll and they are all buying cars.

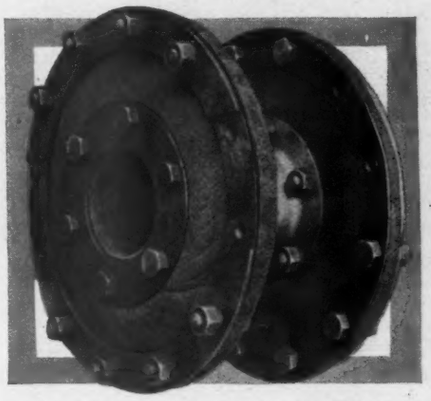


SIDE ELEVATION OF CHASSIS OF NEW UNIC 17-20 HORSEPOWER CAR
The gasoline tank is located on the front of the dash and is detachable by removing three bolts. The filler cap can be seen at the top

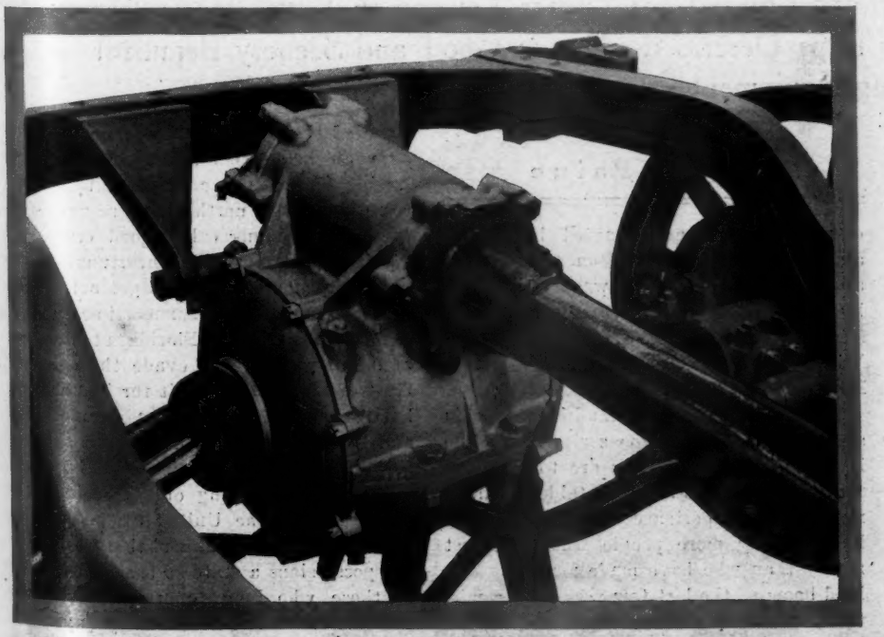
MILWAUKEE PICKS SHOW DATES

Milwaukee, Wis., Nov. 2—Milwaukee's fifth annual motor show, the third under the auspices of the Milwaukee Automobile Dealers' Association, will be held in the Auditorium on or about January 20 to 25, following the New York show and preceding the Chicago show. Milwaukee was not placed on the regular circuit adopted by the manufacturers some time ago and therefore is at liberty to choose its own dates without regard to those selected for the other shows.

Although the dealers' association incurred a deficit of $45,000 by its promotion of the Vanderbilt cup races at Milwaukee on October 2, 3 and 5, the organization will go ahead with its plans for the show. In fact, it is by means of the show that the association hopes to regain part of the losses due to the cup races and assist itself to repay all creditors dollar for dollar. The entire Auditorium will be used for the next show.



LEATHER SHAFT COUPLING OF UNIC



REAR CONSTRUCTION OF DE DION-BOUTON EIGHT-CYLINDER CHASSIS
Note overhead worm drive and inclosed propeller shaft with angularity of rear axle driving members

NEW WAY OF SELLING CARS

San Francisco, Cal., Nov. 1—A new kind of motor car selling organization is being tried out in this state, and is being watched with a great deal of interest by local dealers and by factory representatives. The organization is known as the Mutual Motor Agencies of Northern California, and is composed of the A. E. Hunter Auto Co., of San Francisco, Osen & Hunter Auto Co., of Oakland, Skinner & Elliott, of Stockton, J. C. Skinner, of Sacramento, Cousins & Howland, of Hanford.

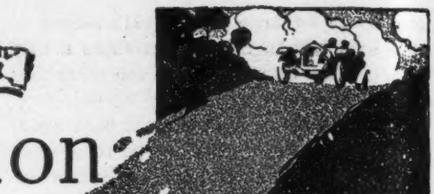
The members of these firms have for several years been more or less intimately associated in business deals, and in the past all of them have been very successful in marketing the Mitchell line. They are now organizing for the special purpose of pushing a popular-priced car.

The organization of the Mutual Motor Agencies will in no way affect the present individuality of the various constituent companies. Each will conduct its own business as now. The handling of the new car, however, will be done as a unit. The Mutual Motor Agencies will form a corporation and elect officers for this purpose. The whole scheme has aroused a great deal of interest among the trade.

OMAHA MAKING SHOW PLANS

Omaha, Neb., Nov. 4—The regular annual meeting of the stockholders of the Omaha Automobile Show Association was held last week. The coming show, from February 24 to March 1, was the topic most generally discussed. An election took place at which C. G. Powell, J. T. Stewart, Guy L. Smith, J. J. Deright and Lee Huff were elected the board of directors.

Routes and Touring Information



FAMOUS SAND BEACH AT ORMOND, FLA., OVER WHICH MANY RECORDS HAVE BEEN BROKEN

Florida a Land of Motor Enchantment

Asa Paine Points Out Attractions Offered for Winter Touring in Land Made Famous by Ponce de Leon—Long Trips Described—Roads Good and Scenery Beautiful —Light Camping Equipment Carried to Avoid Possible Delays

Part I
By Asa Paine

FLORIDA, the land of flowers and sunshine, is acknowledged by all, even the early Spanish explorers, to have a climate not excelled on this continent. When the gods divided and parceled out the good things, they had nothing left for Florida but climate, and for winter touring it is indeed a revelation to the overworked, the nervous and those lacking the excess vitality of youth.

During the winter of 1911, I was prompted to tour through the northern, eastern and central portions of Florida, partly for pleasure and partly to investigate the value of the lands thrown upon the market by land boomers at prices that seemed altogether too high and beyond any possible likelihood of adequate returns to the investor.

Companion Motorists

In making this tour I used a 60-horsepower, two-passenger Stoddard-Dayton runabout most of the time, but on several occasions, while accompanied by family and friends, used a Winton touring car, and on a part of the tour was accompanied by W. E. Blodgett and family in a Peerless, and Thomas H. White and family in a White steamer.

Noticeable Features of Florida

From an agricultural standpoint Florida should not be taken too seriously. While in many instances profits are to be made from citrus groves and vegetables, still, in my 22 years experience in Florida, I have known many more people who have lost money than who have made a profit. The land boom of the last few years was a mistake, and many will regret it. Not a few honest people gave up their northern farms and took all their worldly goods to Florida because of the real estate fairy tales, and some of them now are eking out a miserable existence there, in some instances having become so poor as not to be able to return to the north, they are now, what the old Floridans call "good crackers," meaning thereby the unfortunates who have not enough money to get out of that country, even in the summertime.

Those who know Florida at its best, and journey there to evade the cold and frost of the north, love it for its sunshine, balmy winds, its iridescent summer seas, and the rest and comfort it affords to the nerve-racked business man and those who feel old age creeping on. Florida is the sun parlor of the United States, and we should, indeed, be thankful that we have in our possessions a state so easily accessable to those who long for respite from the snow drifts and tedious wintry days.

During this trip and later ones, I covered a distance of about 2,000 miles, extending from Jacksonville to Rockledge on the

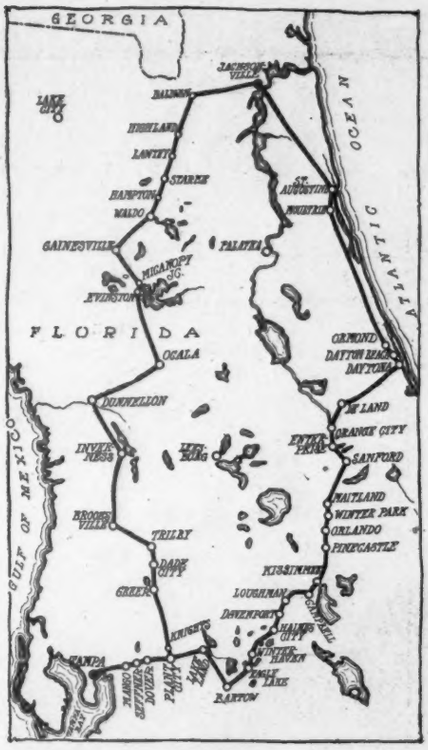
east coast, from Daytona to Tampa, Tarpon Springs and Belleair on the gulf coast, and touching many of the principal inland cities. During this trip we encountered very few bad roads, and was stuck only once, and that, for about 2 hours—on a new embankment which was mostly loose sand. For convenience in event of necessary delays between towns or where the hotels were very inferior, we carried a light tent, two sleeping bags, and a limited number of camping utensils easily stored and covered with waterproof canvas. We had no difficulty in purchasing necessary gasoline and oil at reasonable prices at all points. For the few meals, which it was found necessary to cook, there was an abundance of fresh eggs, strawberries, grapefruit and oranges always obtainable at very reasonable prices.

Start Made at Jacksonville

Beginning the trip at Jacksonville, special note was made of a very energetic good roads movement, and the earnestness with which the citizens of Florida were putting into effect the latest engineering data in the building of their new highways. Ancient and rotten bridges were being rapidly replaced with new ones, constructed of cement and steel, and the surface of the new roadways are covered with shell, marl, red clay or other material, making substantial, as well as pleasant roadways, to tour over. There are a number of short trips over good roads which can be taken from Jacksonville.

Jacksonville is the live business city in Florida. The fact that ocean-going ships can land their cargoes in the wholesale district, gives Jacksonville a great advantage as a jobbing center. Crossing the St. Johns river by public ferry to south Jacksonville, we proceeded towards St. Augustine, and arrived there in a little less than 3 hours, over fairly good roads, and enjoyed the pine flat-woods and expanses of waving palms.

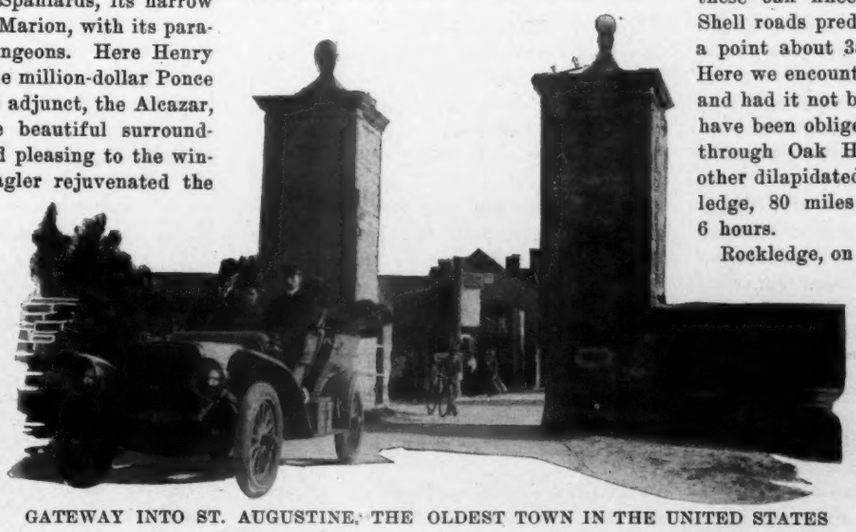
St. Augustine, the oldest city in the United States, entered through the old "City Gates," is quaint, beautiful, historic, and interesting for its ancient stone buildings, erected by the Spaniards, its narrow streets, and old Fort Marion, with its parapets and noisome dungeons. Here Henry M. Flagler erected the million-dollar Ponce de Leon hotel and its adjunct, the Alcazar, both of which have beautiful surroundings, very restful and pleasing to the winter tourist. Mr. Flagler rejuvenated the ancient city by constructing waterworks, street car lines and paving some of the principal streets, largely at his own expense. From St. Augustine to the famous Ormond-Daytona beach, a distance of over, 50 miles over reasonably good roads, we covered in 3½ hours. We crossed several of Mr. White's unique motor car bridges. The road follows the old King's highway most of the distance. About 16 miles from Ormond we stopped at the Knox and Beede orange and grapefruit groves, which are of the largest in Florida. Proceeding a short distance, we crossed the new East Coast canal. This canal connects the inland waterways of the east coast from Palm Beach, on the south, to St. Johns river, on the north, making one of the most picturesque shallow draught winter yatching waters in America.



MAP OF FLORIDA CIRCLE TOUR

Good Golf Course at Ormond

Near Hotel Ormond we passed one of the best golf courses in Florida and rolled out onto the famous beach, whose hard sands constitute a highway from 1 to 200 feet in width, at low tide.


GATEWAY INTO ST. AUGUSTINE, THE OLDEST TOWN IN THE UNITED STATES

Imagine the joy of coursing over these hard sands, perfectly smooth and firm, without a crossroad or policeman in sight. Instinctively, one opens up the throttle, inhales the fresh, warm breezes wafted over summer seas, and the tired motorist feels like speeding on forever without thought of the morrow. Six miles down the beach from Ormond we passed the Florida East Coast Automobile Club, famous for all time to come as the place where the records show the greatest speed man has ever been propelled. A short distance beyond the club house we turned sharply to the right, leaving the smooth beach, crossing the peninsula and thence over ¾ mile of toll bridge, spanning the beautiful Halifax river at Daytona, and put up at the winter home of the writer.

Daytona on the east coast is well worthy of special mention. Here we have a new modern fireproof hotel costing $425,000, and something like thirty other hotels of various descriptions accommodating 15,000 to 25,000 tourists in the winter season. The city council has reserved for parkage purposes all of the live oaks draped with gray Spanish moss, and many other beautiful trees and shrubs, especially the stately palms. The entire city has cement sidewalks, shell streets, fine stores, and many beautiful winter homes.

Shell Roads Prevalent

Next we decided to go to Rockledge. From Daytona to New Smyrna we passed through long avenues of live oaks, with their somber canopy of Spanish moss overspreading the roadway for many miles.

New Smyrna, next to St. Augustine, is, without doubt, one of the oldest towns in the United States. Here we find the ruins of Turnbull Castle, Monasteries, old Spanish missions, and sugar mills, the latter worked in Turnbull's time by the Minorcans on the profit-sharing plan. Here are to be found immense live oaks, some of which have a girth of 30 feet and branches of great length. In early days the English and Spanish settlers gathered great numbers of oak ship-knees, and many a sturdy merchant-man and man-of-war boasted of these oak knees with strength of steel. Shell roads predominated until we reached a point about 35 miles south of Daytona. Here we encountered the Indian river flats, and had it not been a dry season we would have been obliged to turn back. We passed through Oak Hill, Titusville and a few other dilapidated towns, and reached Rockledge, 80 miles from Daytona, in about 6 hours.

Rockledge, on the Indian river, the home of the Indian river orange, and before Lake Worth came into prominence through Mr. Flagler's efforts was indeed the Palm Beach of the south. It is still a beautiful, quiet winter resort.

(To be continued.)

THE OLD MILL AT DE LEON SPRINGS, FLA., AND THE ST. JOHNS RIVER FERRY

Interesting Motor Tour Through India

By Frank Robertson

EDITOR'S NOTE—The interest and fascination of motoring in India are alluringly set forth by Frank Robertson, of Portland, Ore., who, with Mrs. Robertson, spent several months last winter piloting his Pope-Hartford roadster through this wonderland of the east. His narrative, which is given herewith, also furnishes valuable information for other motorists contemplating such a trip.

FROM the many inquiries made of me regarding roads, etc., of India, I find there is much interest being taken in that country, especially by those of the motor world. November, December and January are beautiful months in India, while in Ceylon perfect weather prevails in February. When leaving New York for Hamburg on October 14, 1911, we decided to go to India, provided early accommodations could be secured. Without taking our car from the case we reshipped it to London, thence to Bombay by P. & O. steamer Maldja at a cost of $200.15. A cheaper rate could have been secured, but we had no time to shop. We boarded the same steamer at Marseilles. Fourteen days are required for the trip, which at that season of the year is most pleasant and enjoyable.

Landing in Bombay one gets a first touch of real Indian life and it is most interesting. Costumes are made in all colors of the rainbow and are fascinating. Three days are sufficient to see all the sights of Bombay and environs.

Leaving Bombay the grand trunk roads lead in a northeasterly direction to Agra, a distance of 900 miles. The first town of any importance is Indur. Covering this portion, the road is a little rough, due to heavy cart traffic. At Indur a supply of gasoline must be carried sufficient to cover the next 300 miles. The road is good, smooth and portions very fast. Two streams must be crossed, nothing dangerous, but at times the services of a team of bullocks is necessary to assist pulling through the sand for a short distance. At Agra the road is intersected by the grand trunk road extending westward to the Persian border, and eastward to Calcutta with branches to all important points.

Grand trunk roads of India are all excellent ones. They are 100 feet in width, all macadamized, with stone culverts, and lined on each side, for miles in many places, with trees which completely arch the road. There are no sharp corners or turns, no speed limit, and very fast time can be made. It is a good place to try out the speed of a car but a poor place to detect weak spots, for while motoring in India and Ceylon we did not strike a single bump.

The distance across northern India is about 1,800 miles. Gasoline and oil can be obtained all along the roads at frequent intervals. Two brands are used in India, Pratts New York and shell. I found shell the better. It is all put up in sealed cans and costs from 1 rupee to 1 rupee 4 annas per gallon, or 33 to 41 cents.

Many of the mahrajahs, especially the younger ones, are buying cars, and the general demand for gas and oil has created a supply.

While traveling in India, either by motor or train, it is necessary before starting out to obtain a supply of bedding and a well-filled tiffin basket. Hotels as a rule are not of the best outside the larger cities, and in motoring it is often necessary to stop for the night at Dak bungalows. These are road houses built by the government for the convenience of travelers. They usually contain a living room, two bedrooms with Indian bath rooms attached, and a detached kitchen, table, chairs, beds without bedding, and a few dishes. They are usually clean and provide a comfortable place for the night—preferable to many hotels. A native caretaker is found somewhere about the place and the charge for a night or 24 hours' occupancy is 50 cents only. They can be occupied for but 24 hours provided others came along and want accommodations—first come, first served. Bungalows are located at distances varying from 10 to 20 miles.

There is no scenery to speak of, the coun-

Road Directions for

ANOTHER JACKSONVILLE TOURIST

ST. FRANCISVILLE, ILL.—Editor Motor Age —Please publish a route to Jacksonville, Fla. We would like to go through Nashville, Tenn., and Atlanta, Ga.—O. Lewis.

Go to Mt. Carmel, then Princeton, Warrenton, Stringtown and Evansville, where you ferry across the Ohio river to Henderson, Ky., and on natural dirt roads to Crofton, Empire, Morton's Gap, Earlington, Madisonville, a distance of 102 miles. Over rolling country it is 27 miles to Hopkinsville, Square, Longview and Oak Grove, then routing through Clarksville and Ashland you reach Nashville, coming into the city over a couple of miles of macadam. In wet weather this clay soil is very slippery and in some cases would make it quite impassable.

Nashville to Chattanooga is 247 miles and some of the going is quite bad, although not impossible to travel over. The routing is Murfreesboro, Shelbyville, Fayetteville, Meridianville, Huntsville, Mayfield, Paint Rock, Woodville, Larkinsville, Scottsboro, Jasper and Rankin's ferry over the Tennessee river at a charge of 50 cents. Then it is 143 miles to Atlanta, the towns being Lafayette, Summerville, Rome, Cartersville, Acworth, Kennesaw, Marietta and Atlanta. Between Atlanta and Augusta there is mostly gravel roads. The 171 miles through Decatur, Ingleside, Clarkson, Stone Mountain, Redam, Lathonia, Rockdale, Covington, Social Circle, Rutledge, Madison, Greensboro, Union Point, Crawfordville, Camak, Thomson, Bonesville, you will find some

try being level, and would be somewhat monotonous except for the native Indian life one sees in the small villages. Darjiling, however, is an exception. It is 20 hours by rail from Calcutta, situated at an elevation of 5,000 feet, with a superb view of the magnificent Himalaya mountains. I might also include Simla, in the mountains west of Delhi.

Native travel in India and Ceylon is on foot and by bullock carts. One of the essential things on a motor is a good shrill whistle. Natives are as slow as ducks in clearing the road and show less judgment. They have no judgment as to the speed of a car and after taking to one side of the road usually decide to go to the other. The result is, naturally, many accidents.

If you are unfortunate enough to knock one down, no attention need be paid; if injured, 5 rupees will usually cure him, and if killed 50 rupees will satisfy his relatives. Bullock carts are a great annoyance, and there are many. When several are approached one turns to the right, another to the left and others stay in the road. Camel carts show more respect and vacate the road to a safe distance—thanks to the intelligence of the camel and not the driver. Our musing experiences are too numerous to mention, but all add to the interest of motoring in India.

We found Calcutta a most interesting cosmopolitan city. The great race meet is held each year the latter part of December and the first of January, and is worth going miles to see. The track, grounds and buildings are the best I have ever seen and the large attendance of natives, and to see them gamble is a great sight.

From Calcutta we went by steamer to Colombo. There is a good road from Bombay across southern and central India to Madras. The cost of shipping the car was $40. I used the same crate, having shipped it by freight K. D. from Bombay to Calcutta at a cost of $25.

Ceylon is a garden spot, the roads equally as good as India, not as wide. In 10 days one can cover the whole island; a month, however, can be spent with much pleasure. Gasoline and oil obtained at all points, price about the same as India.

In India, especially at the durbar at Delhi, the car attracted much attention. It was known as the "big brown Pope-Hartford American." I had no trouble with it whatever and returned to Marseilles from Colombo with the same six tires that I left America with and am still using one as an extra.

While traveling in India frequent changes of clothing is absolutely necessary. Mornings, until 9 a. m. an ordinary fall suit, from 9 a. m. until 6 or 7 p. m. pongee suit and topee. In the evening, heavy suit and overcoat. The going down of the sun is a warning for a change of clothing, and if one observes this rule no alarm need be felt as to health. We ate practically everything set before us and drank only bottled water, and were not sick a minute.

RUINS OF ANCIENT CONVENT NEAR NEW SMYRNA AND THE COMPANION CARS

New Trail from Edmonton Northward

WHEN the work is completed this fall on the trail from Edmonton north it will be possible to drive a motor car to Athabasca, Alta., 100 miles, in 4½ hours. Road Inspector Bell, who has crews at work on various divisions of the road, expects to finish the job within a week. Permanency is the keynote of the improvement, which is being carried on under the direction of John Stocks, deputy minister of public works for Alberta.

The provincial government has made large expenditures in the Athabasca district during the last few years. It is more difficult to build good roads in this district than in other parts where there is no timber. The rapid development of the country on every side has created a constant demand for wagon roads. The work accomplished this season is far more comprehensive than that of any previous year, especially in converting old trails into wagon roads. The main freight roads are being put into condition following the heavy traffic of last summer.

The road work at and near Athabasca has been extensive and will afford better transportation facilities than ever.

Touring Readers

stretches of clay, the worst being between Madison and Greensboro.

With 60 miles of sand on the best road between Augusta and Savannah, it is 133 miles through McBean, Waynesboro, Perkin, Millen, Scarboro, Rockyford, Statesboro, Pretoria, Stilson, Blichton, Pooler and Savannah. Then it is 177 miles through Freedman's Grove, Riceboro, Eulonia, Darien, ferry to Dents, Brunswick, Old Sterling, Tarboro, Owens ferry, Kings ferry and Callahan. At Darien the charge is $5 for the ferry, and at Owens and Kings ferry they are $1. Brunswick to Jacksonville is 100 miles over mostly fair dirt roads through pine barrens, with an occasional stretch of deep sand.

TWO-DAY TEXAS TRIP

Dallas, Tex.—Editor Motor Age—Please give me the best route from Dallas to Hot Springs, Ark., the road conditions and distance.—K. L. Farley.

Dallas to Texarkana is 217 miles and the roads fairly good, in some stretches very good. The towns are Richardson, Plano, McKinney, Melissa, Anna, Sedalia, Pilot Grove, Whitewright, Bonham, Dodd City, Window, Honey Grove, Petty, Hightown, Brookston, Paris, Blossom, Detroit, Clarksville, Annona, DeKalb, Leary.

Texarkana to Hot Springs is 138 miles and the intermediate towns are Homan, crossing the Red river on a ferry to Fulton, and continuing to Hope, Emmet, Prescott, Boughton, Okolona, Dobyville, Arkadelphia, Friendship, Social Hill, and Lawrence.

W. Carbys Zimmerman, Architect

TWO-CAR GARAGE OF FREDERICK B. STONE, CHICAGO, WITH FOUR-ROOM APARTMENTS FOR CHAUFFEUR ABOVE

Housing the Motor Car

The Garage for the Monied Class

MOTORISTS who are lucky enough to be the owners of more than one pleasure car for the use of themselves and their families usually are sufficiently well equipped in this world's goods to provide for the vehicles a well appointed garage. Along with its function as a garage proper, the building often is designed to fulfill other purposes than that of simply a place for housing the cars. It can be made to combine quarters for the chauffeur and his family or house other servants or to serve as the heating plant as well.

Such a building is the garage at the residence of Frederick B. Stone, Chicago. It is a two-story and basement structure about 42 by 24 feet in size, designed to house two cars, an electric and a gasoline car. The upper story is fitted up to provide apartments for the chauffeur and his family and the basement contains the hot-water heating plant for both residence and garage. The latter is situated at the rear of the residence and is constructed of buff pressed brick and in general shape and color is intended to harmonize with the residence to which it is an adjunct. Diamond-shaped panes in the windows give an Elizabethan effect to the whole, and a semi-octagonal tower at the front relieves the four-square impression the design would have otherwise.

Editor's Note—With this issue Motor Age begins a new department under the head of Housing the Motor Car. Its purpose is to assist the reader in planning the arrangement and roughly estimating the cost of a garage for his own car. This will be accomplished by descriptions with photographs and floor plans of garages already in use. No one type of building will be featured over others, as the series will include low-priced garages, apartment house garages and country garages.

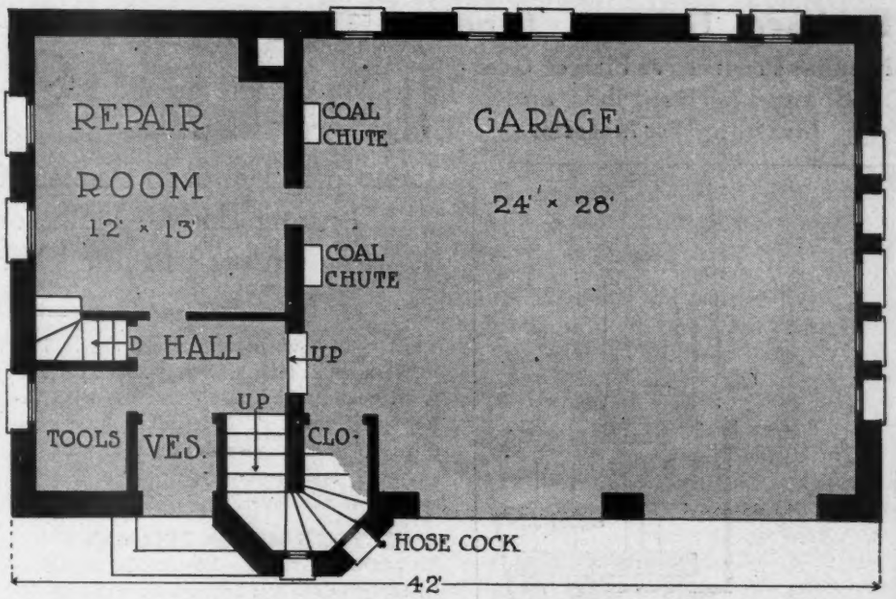
Two separate sliding doors give entrance for the cars to the garage proper, which is about 24 feet wide and about 27 feet in length. This room has a cement floor with a drain in the center, wood paneled ceiling and brick walls. It is well provided with windows, there being five on each of the two outside walls, while the upper two-thirds of the sliding doors are mostly glass. A mercury arc charging panel for the electric car occupies one corner and a sink with hot and cold water another. Gasoline is kept in quantities in an underground storage tank, and an oil cabinet contains a supply of lubricant for the machines.

As there are but two cars housed in this garage and each has a separate entrance no turn table is needed. But a cement drive the full width of the building provides a turning space as well as a washing floor. Off the garage room is another room about 12 feet square which serves as a repair shop for any minor repairs that are to be done at home. This contains the usual work bench with vise, etc. Tools are kept in a separate room accessible to both garage room and repair room. Lockers lining the walls of the tool room keep the small tools and parts from injury.

In the wall separating the garage room from the repair room are two coal chutes

through which the fuel for the furnaces below is shoveled into the bins. In order to fill the bins it seems that it is necessary for the coal wagons to drive into the garage, a requirement which is the one bad feature in an otherwise excellent arrangement. These chutes open in the boiler room, which is directly beneath the repair room. The second story comprises a very complete four-room apartment for the chauffeur or house servants. There are, of course, electric lights and gas in the garage, with a private telephone communicating with eight rooms in the residence.

As to the cost of such a garage: the building as turned over to the owner by the architect represented an outlay of approximately $7,500. This included the cement floor, underground gasoline storage tank, heating plant and electric wiring. The oil cabinet, tool cases, work bench, etc., meant an added cost of possibly $300. The mercury arc charging panel cost about $200.

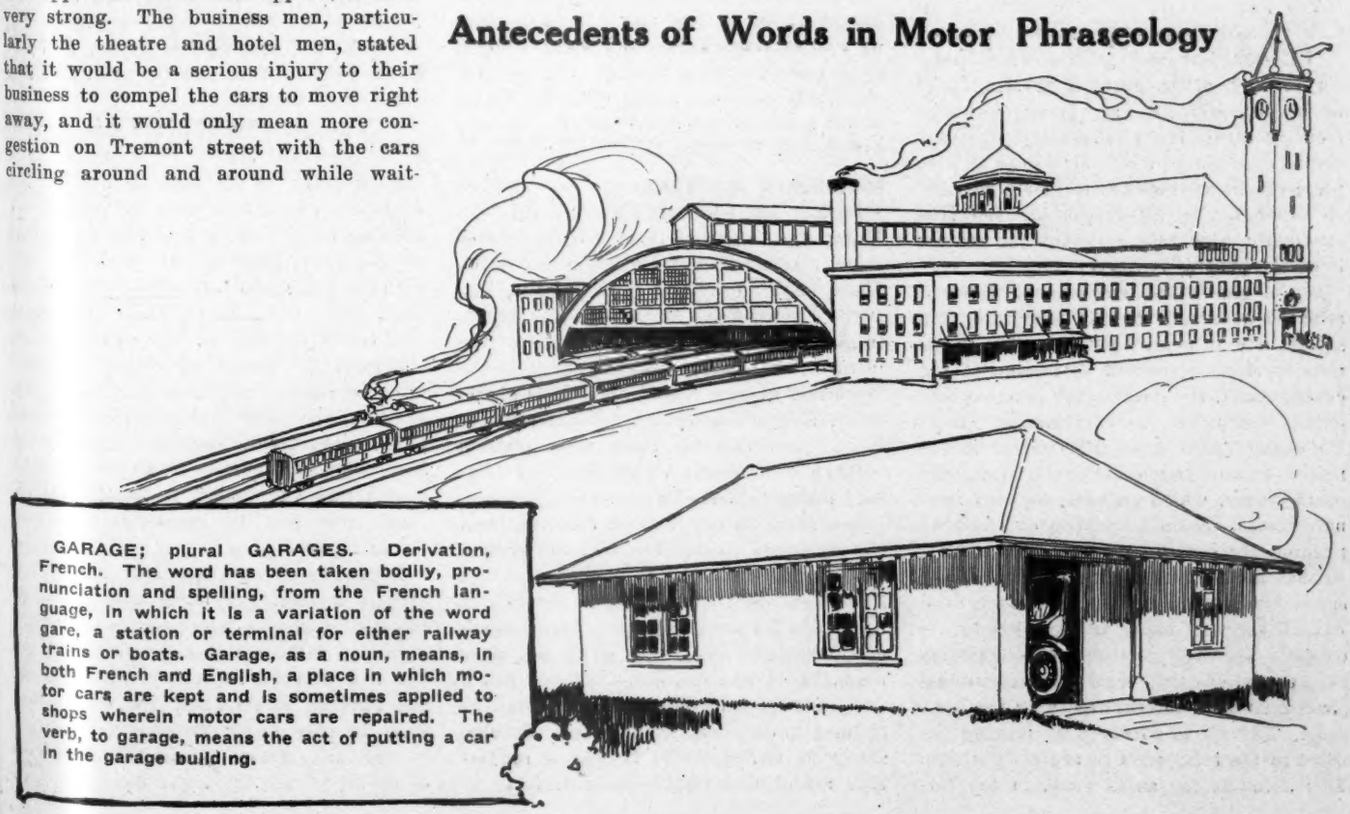


PLAN OF FIRST FLOOR OF STONE GARAGE

Boston Wrestling with the Traffic Congestion Problem

BOSTON, Nov. 2—Business men and motorists alike united last Tuesday when the Boston Street Commission gave a hearing on changing the traffic laws in the city which would limit the time of cars standing on Boylston street between Tremont and Arlington to just sufficient time for the passengers to alight or get aboard. At the present time motor cars are allowed to stand on the southerly side of that street for 20 minutes at a time. When those who were to favor the proposition were asked to state their views no one appeared. But the opposition was very strong. The business men, particularly the theatre and hotel men, stated that it would be a serious injury to their business to compel the cars to move right away, and it would only mean more congestion on Tremont street with the cars circling around and around while waiting for their owners. The chairman of the commission intimated that parking spaces would be provided on Charles street alongside the public garden, but the opponents said this would not be of any use, for the drivers could not know when to return and at night electric signals would have to be used to call them or messengers would have to be dispatched in case of bad weather when the owners did not want to walk to their cars. The commission then said it would take the matter under advisement. It was brought out that there had never been an accident on Boylston street due to cars standing there. The motorists were asked what they thought of the plan to prevent cars standing on the northerly side of Beacon street and of making it a one way street from Tremont to the State House, but to this there was no objection because it is a very narrow thoroughfare and as a matter of fact the motorists in the past have stated that this should be done. So a compromise of some kind is expected to result.

Antecedents of Words in Motor Phraseology



GARAGE; plural GARAGES. Derivation, French. The word has been taken bodily, pronunciation and spelling, from the French language, in which it is a variation of the word gare, a station or terminal for either railway trains or boats. Garage, as a noun, means, in both French and English, a place in which motor cars are kept and is sometimes applied to shops wherein motor cars are repaired. The verb, to garage, means the act of putting a car in the garage building.

Packard Gearset Type

Peculiar Progressive Plan of Gear-Change Is Described and Illustrated for Motorist

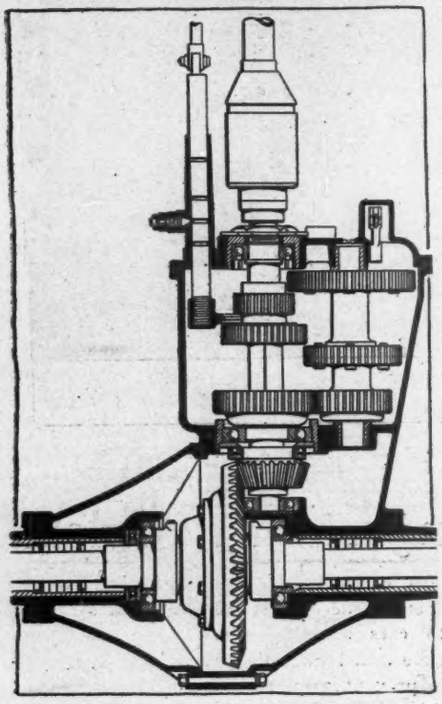


FIG. 1—PACKARD REAR-AXLE CHANGE-GEAR

HOWE, Ind.—Editor Motor Age—Please tell me what system of gearset the Packard uses. If progressive, can any desired speed be used for starting. If so, which ones? Please illustrate and explain.—S. L. Y.

The Packard gearset is of the progressive type, in which the neutral position is between low and intermediate speed. As in any other gearset, starting may be accomplished on any gear, although from neutral it is necessary to pass through second to reach high gear, and to press the lever sideways to attain reverse. In other words, all speeds are selective except the high gear, although the gearset is of the progressive type.

Fig. 1 shows this mechanism, which is situated as a unit on the rear axle. As shown, it is in neutral position. The transmission shaft transmits no motion to the countershaft, the gear at the extreme rear being free upon the transmission shaft. To engage first gear the control rod is pulled forward by a backward movement of the lever, which engages the two rearmost gears. Second speed is obtained by pushing the control rod back past neutral so that the two central gears mesh. Third speed is obtained by pushing the control rod all the way back, or the lever to the extreme forward position, which meshes the teeth of the central transmission-shaft gear with internal teeth on the back gear. Reverse is obtained by moving the lever to the left, when in neutral position. This actuates the small yoke, in the forward right-hand corner of the case. This raises a small long-pinion, beneath the forward gears, which meshes across with the low-speed gears. This is linked by a separate rod to the gear-shift lever, which is swiveled, and operates only on a sidewise motion of the lever.

The Readers

Gearshift Control on Packard Car—Illinoisan Designs 24-Hour Touring Body—Matheson Car Missing—Must Keep Lamps Lighted When on Public Roads

A DOCTOR'S MOTOR PULLMAN

Granite City, Ill.—Editor Motor Age—In reply to several inquiries regarding designs for pullman bodies, or sleeping arrangements, I desire to submit a sketch which I have used successfully for three seasons.

My car is so arranged that it can be converted into a pullman berth in a few seconds, without getting out in the weather. Simply unfasten two hooks at the back of the front seat, and there you are. There are no doors on the right side of the body, which makes it stronger. The seats are so arranged that in position they are very deceptive, in fact, one would hardly notice the separation in the seat, unless attention was called to it.

The body is 8 feet long and 3 feet, 6 inches wide. The bed when down is 6 feeet long and is covered with a pullman hair mattress. The back of the seat hinges at the bottom and is held in place by two carriage hooks, and when dropped back rests on two supports. You will notice that the body hangs over the frame at the rear, also a box beneath for oils and extras.—F. E. Tulley, M. D.

MATHESON MATTERS

Bath, Md.—Editor Motor Age—In Motor Age, August 8 issue, a question was asked relative to the Matheson car which Jimmy Ryall drove at New Orleans, La., about 4 years ago. Motor Age was unable to give an answer. For the beenfit of the inquirer would state that the car is in the Matheson garage, New York. It is chain-drive, and a four-cylinder, 90-horsepower car. I saw this car there when passing through on a tour through the New England states.—E. A. Twarts.

According to information received from the Matheson Automobile Co., the Matheson above mentioned is not now at the New York Matheson garage, nor has it been seen for several years. The last address available of Jimmy Ryall is Palace hotel, San Francisco, Cal. The car had a four-cylinder 6 by 6-inch motor, rated at 60 horsepower, but which would develop above 90 horsepower. It was a regular 1907 model with double-chain drive.

Law on the Tail Light

Lamp Must Be Lighted if Car Is on Street, Whether Machine Is Running or Not

CANTON, Ill.—Editor Motor Age—Is a person liable to arrest and fine under the Illinois motor car law, for leaving a car standing on the street or other public highway without the lamps being lighted, and burning, as specified under the head of lamps.

2—Define the meaning of the word "proceeding."

3—A case has come up in this city where the owner lighted his rear lamp and after running two blocks, less than 1,000 feet, entered a public building, and while therein was informed by an officer that the rear lamp was not burning and he was accordingly forced to pay a fine for the so-called offense. Has Motor Age any available decisions on such cases?—J. T. J.

1—Yes.

2—A legal proceeding is the prescribed legal action that is taken in response to a complaint. In this case it would consist of the arrest of the offender, his being required to furnish a bond of individual recognizance, summons to appear at court at its next session, and the trial and disposition of the case.

3—The action taken in the case referred to is perfectly legal. It is the owner's responsibility to see that he has his car equipped with a light that will not go out unexpectedly. Motor Age has no records of individual cases of this kind, but that such is the customary action in such a case, is known. If evidence is brought into court proving that the owner left his car upon the public streets or highways after sundown with the tail light not burning, the judge has no other recourse than to prescribe the legal penalty, in such degree of severity as he deems proper considering the extent to which the offense was due to carelessness on the owner's part.

Regardless of any precedent, it is so obviously against the letter and intent of the law to leave a motor car in the public highway without lights, jeopardizing the life and property of every other user of the road or street, that the owner who fails to take every precaution to insure himself and others against this danger is deserving of the full legal penalty.

Clearing House

Coal Oil as Anti-Freeze—Dislikes Present Design—Sudden Throttle Closure Causes Back-Fire—How a Minnesota Misfire Was Remedied

Kerosene for Cooling

Coal Oil Will Not Freeze, But is Dangerous in Use and Will Not Cool on Warm Days

CHICAGO—Editor Motor Age—Last year someone in the Dakotas wrote that he had replaced the water in his radiator with kerosene and defied freezing and all other radiator troubles after having shellaced the inside of his hose connections. Has any unfavorable experience been reported on that method or have any serious objections been offered?—W. R. G.

From time to time reports of wonderful success of kerosene are heard, but the experience of Motor Age has been such as to lead it to advise prospective users of this agent to observe extreme caution. As far as can be learned, kerosene is a good cooling agent only in extremely cold weather, as in weather above freezing it has been found to be a poor conductor of heat, requiring more cooling surface than water to prevent overheat. One case has come under our notice where on a moderately warm winter day a motorist using kerosene in his radiator found in 8 miles of running that his motor had overheated to such an extent that his ignition was affected, and his radiator leaked in a dozen places. He was forced to expend $30 to repair the radiator, and considerable time in bringing his ignition back to where it should be. In favor of this fluid, kerosene lubricates the pump, and if the hose connections are shellaced on the inside before using will not injure these parts, but is likely not to prove efficient in any but extremely cold weather. At all times, however, kerosene when warm is highly combustible, and emits an offensive odor. Alcohol and glycerine, mixed with water, will be found equally as satisfactory as kerosene in the prevention of freezing, and somewhat more economical. Formulas for the use of these agents were published in these columns in the issue of October 17th.

ECONOMY OF FOUR AND SIX

Lenox, Ia.—Editor Motor Age—I have a 30-horsepower six-cylinder car. How many miles per gallon of gasoline should I get out of it?

2—Would I get more per gallon of gasoline out of a 4-30 than my 6-30?

3—With two cars of the same horsepower, which would take the more power, a 30-horsepower car with 36-inch wheels, or a 30-horsepower with 41-inch wheels?

5—Do the Dayton airless tires give as much satisfaction as the air type, and do they have as lasting qualities?

6—How many of the 1913 models are using the Delco self-starting system? Name them.

7—Will the dynamo now used in the connector generate enough current to keep the motor running while one is using the starter? If so, why not have an electric as well as gasoline car. I have been told that it would.—A Subscriber.

1—Without knowing what type of motor you are using, the weight of your car, and the roads over which it is being operated it is impossible to say. With a car whose weight did not exceed 2,500 pounds and which was being operated on average roads, a well-designed motor should produce not less than 15 miles to the gallon of gasoline.

2—This, too, is difficult to say, as a well-designed six would be more economical than a poorly designed four. Theoretically, however, the four would show better fuel efficiency than the six, if both were perfectly designed, because of the inevitably greater weight of the six.

3—Presuming that the cars premised are otherwise the same, a car with 36-inch wheels would prove the more efficient on smooth and hard roads, while on the other hand, one with 41-inch wheels would prove the more efficient on soft, sandy, or hilly country. This is simply a question of leverage, where a lever is required, it is more efficient, where it is not, it is a useless hindrance.

5—Motor Age never has had an opportunity to test out these tires at first hand.

6—As all of the 1913 models have not yet been announced, a complete answer to this question is impossible. Of those announced, the Cadillac, the Cole, the Packard, and the Hudson, are using the Delco system.

7—This question is not clear.

Duryea Likes Editorial

Appoves Movement for Owners' Protection and Suggests Amplification of Scope

SAGINAW, Mich.—Editor Motor Age—The remarks of Motor Age on "owner's protection" are in line with a much felt want, but I doubt if they are the true remedy. No mechanic can tell the condition of a car until he tears it down and he is a wonder if, even then, he can tell how long it will take him to fix it up. Many defects only show after the parts are all apart and many times the fixing is a much more difficult job than it would seem at first glance. The result of such a method is that the garage owner either will lose money because the workman puts in much more time than was expected or else he must protect himself by guessing high enough in the first place. The only remedy with any given job is to put a good, intelligent man on it and pay the price, that subsequent developments show is fair.

But there is a remedy which protects the owner and begins much sooner. It is so fool-simple that one would think any owner would see it and favor it. But so long as he buys by sight and not by sense it probably will not be used. It is simply this: Buy only cars that have all parts accessible.

Motor Age is quite right in asserting that competent repair men will better the matter, and more right in calling attention of makers and motor car associations to the matter. They can remedy it. Let them give us accessibility contests, as well as races and tours.

Let all entrants drive around the track to show operability. Then let the judges call for a piston or similar part. The man who first gets the piston from his engine to the judge wins the first part of the prize. Then at a signal let the parts be returned to position and the car again driven to show operability, the winner to have the second part of the prize. This would, of course, require skill, but what contest does not?

Contests like this would in a few years cut repair bills to such a low figure that they would cease to be taken into serious consideration. Nothing would afford such an incentive to real progress as some education along this line. Manufacturers are not going to change their designs in this respect until they are forced to by public demand.

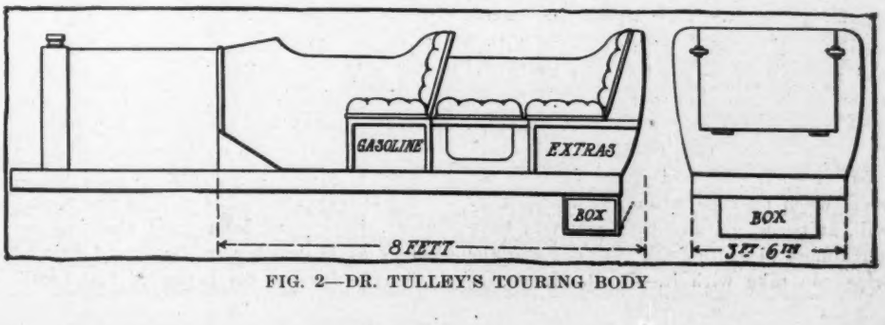


FIG. 2—DR. TULLEY'S TOURING BODY

The motor car for the masses must be small, light and simple and publishers should be educating to that end. The motor car business of the world can be had by the United States if we develop along this line. The success of one maker of light cars ought to be enough evidence of this.—Charles E. Duryea.

A MISS AND ITS REMEDY

Minneapolis, Minn.—Editor Motor Age—An acquaintance and friend of mine has been troubled with a large amount of missing in cylinder No. 1 in his touring car, and has tried very nearly all advice which has been offered. Finally he came to me for advice.

After going all over the ignition system and finding it in good order I thought I would take a look at the plug in the offending cylinder to see if it was as it should be for perfect work. He assured me he had put in three new plugs.

I took my wrench and took out the plug and the first thing I noticed was the points were too far apart to do the right kind of work. I at once proved this to his utter satisfaction, by first laying the plug on the cylinder head and running the motor with three cylinders. The spark would fly to pieces, look scraggy, jump from one point to the other but hardly ever right between the points where it should go.

We tried it on the batteries and magneto but the result was almost the same. There was a light reddish spark with but little hot in it and so wide across the spark-gap, that even the fiery magneto could not properly boost it across the gap.

I reduced the gap about one-half and then made contact with the head of the cylinder as before. I put on the batteries and a careful turn to the contact point showed that my medicine was most truly effective inasmuch as a bright, blue-purple, continuous stream of fire was constantly running between the plug points as long as contact was made. Nothing like the one before was to be seen. No long threadlike pale red, intermittent fire was in evidence. We now placed the plug in its seat and I turned the switch over onto the magneto and the second turn of the crank brought instantaneous response and the deed was done.

The missing was no more in evidence, but in its place a very steady fire of every cylinder was the result.

When a motor is right it's right, and wrong, wrong. It is so very easy to find out by being careful to get the facts for a base from which to calculate upon, but asking so many questions of the editor who is not familiar with the case brings not nearly half as good results as to get right down and find out what is wrong with your motor and remedy it yourself. In other words: Get familiar with every part of your car and know how to fix them when they go wrong, as wrong they will, at times, go, and then you will have much more pleasure from your car and the trips you take with it.—U. R. Mason.

Throttle Causes Popping

Sudden Choke-Offs Cause Back-Fire Because of Weak Valve Spring

EDINA, Mo.—Editor Motor Age—I have a 40 horsepower car and I notice that it backfires, or pops, when, after speeding the car up to 35 or 40 miles per hour, the throttle is suddenly closed. Is this due to some fault or is it merely the nature of some engines? Have had three other cars and never noticed it before.

2—Why does not Barney Oldfield participate in races any longer?

3—By whom is the Jay-Eye-See racing car made?

4—What is the world's record for speed, and by what driver and car is it held?

5—What is the horsepower formula used by the Royal Automobile Club of Great Britain?

6—What is the name of the largest motor car ever built, how many cylinders has it, and what is the bore and stroke? The writer refers to the car with the largest engine.

7—By whom is the so-called wild-cat whistle made?—Motorist.

1—This back-firing or popping is caused by your inlet valves, which are not as tight as they should be. When the engine is run at high speed and the throttle suddenly closed, the volume of gas admitted to the manifold is much too little for the speed of the motor, and while the motor is slowing down to the proper speed for such a slight opening, a vacuum is created on the suction stroke of each cylinder that is not filled in the short inlet valve opening, from the small throttle opening. The result is that on the compression stroke, when normally the compression is great enough to seal the valve tight, there is still a vacuum in the cylinder, so that the valve remains open, due to slow spring action. What charge there is in the cylinder collects in two or three strokes and is ignited by the spark with the inlet valve partially open. This causes it to back-fire through the carbureter. Sometimes the compression and volume of the charge is not sufficient to ignite, so that it is expelled into the red-hot exhaust pipe and muffler, where the hot carbon fires it. To totally eradicate this by adjusting the valves alone you would have to increase their tension to such an extent that they would not only not open properly, but would wear unnecessarily. The best plan is to fit stiffer springs, with the same adjustment. It must be understood, however, that sudden throttling is not to be advised, as the engine is not intended as a brake. Always throttle and accellerate moderately, and use the spark in conjunction, using the clutch or clutch and brake to slow down.

2—Barney Oldfield is still in the racing game, having made a good showing recently at Milwaukee in the Grand Prix.

3—The Jay-Eye-See is the old Fiat Lewis Strang formerly drove and which has been modernized by Louis Disbrow.

4—The fastest speed in a horizontal direction ever made by man was attained by Bob Burman in the Blitzen Benz at Daytona Beach, Florida, on April 23, 1911, the time being 25.40 seconds for 1 mile, a speed of 141.73 miles per hour.

5—The R. A. C. formula, used by the Royal Automobile Club of Great Britain, is the same as the old A. L. A. M., now the S. A. E. formula. It is as follows:

$$\text{Horsepower} = \frac{D^2 N}{2.5}$$

In which,

D=Diameter of the cylinder in inches.

N=Number of cylinders.

6—What is claimed to be the largest motor car ever built was made to the order of the Chief Inspector of Finances of France. It has a wheelbase of 198 inches, a six-cylinder engine of 160 horsepower, and an eight-passenger body. The largest motor ever put in a motor car is claimed to be that in the Jay-Eye-See, which is the old Strang Fiat, with a bore of 9¾ inches and a stroke of 8⅝ inches.

7—This whistle has never come to the attention of Motor Age.

SWEATING OF INTAKE MANIFOLD

Vicksburg, Miss.—Editor Motor Age—What is the cause of intake manifold sweating until water runs and drips off? This is a four-cycle 20-horsepower engine which seems to run and develop good power. Is it right for the manifold to get wet? Is it not caused by the air inlet spring on carbureter being too strong, causing a hard suction through the air adjustment?—J. A. Williams.

The sweating of intake manifolds is caused by the condensation of the water in the air next the manifold, due to its low temperature. This low temperature is due partially to the vacuum present in it at medium to high motor speeds, caused by the engine suction; and principally to the rapid evaporation of the gasoline. As a general thing this phenomena is more noticeable with a slightly rich mixture than when the mixture inclines toward leanness, as the greater the percentage of gasoline there is in the mixture passing through the manifold, the more rapid will be its evaporation, and hence the temperature drop caused by the evaporation of the volatile spirit will be correspondingly greater.

There is no harm in this sweating, provided you are getting good results and economy from your motor. However, a cold manifold is likely to cause condensation on the inside of the manifold, condensation, in short, of the charge. This, of course, depends to a large extent upon the length of the manifold, as in a short manifold there is less likelihood of this resulting than in a long one.

The air adjustment, if wrong, would undoubtedly augment this tendency, as it would produce a richer mixture than is

normal, but if this were the case your motor would probably not give you good power and would give off a strong gasoline odor. Several American and European manufacturers waterjacket their manifolds to remove this effect, or build them into the cylinder block. The reason for this is not so much that the effect of a cold manifold is itself feared, but is because increased fuel efficiency results from a pre-heated charge. A waterjacketed carbureter, or warm-air intake, will remove this tendency in the same manner. In winter a layer of ice from the condensed moisture in the air often forms.

MISSING OF FORD

Union, Ia.—Editor Motor Age—What is the matter with my model T Ford when it will spark only in two plugs? At one time one plug will give a good spark, and the next day it will be another plug. It has a master vibrator. Would the timer have anything to do with this? I have adjusted the vibrator but this does not seem to help.—Reader.

By the wording of the above it is inferred that you have taken the pains to assure yourself of the fact that you are not getting a spark in the plugs to which you refer, and that the trouble is not from a poor mixture, loss of compression, etc. If you get a good spark at times in one plug, and not in another, and at other times in the other and not in the one, the trouble clearly is in the timer, or in an imperfect circuit. The master vibrator cannot be blamed for this, as a failure in this member would affect all of the plugs alike. The same applies to the magneto.

Your statement regarding the vibrators removes all doubt as to these members. The next place to look is in the timer. Take it apart and look at the contacts. If they are worn or badly grooved, replace the defective parts, clean it thoroughly with gasoline or kerosene and replace it. If this does not correct the fault, there is no other way to find the trouble but to go over every inch of wiring in the system, looking for the three possible causes of current leakage—short-circuits, loose connections or broken wires and damaged insulation, which may produce ground leakage or short-circuits with other wires.

The most likely cause of your difficulty, if you are certain that the trouble is in the ignition system, is a loose, worn or dirty timer. If all of the above efforts fail to locate the difficulty, have some competent expert examine the coils for internal grounds, which may have developed. If this is the case, to repair it may be found as expensive, or nearly so, as replacement with a new coil. A new coil is always preferable to a repaired one, as a faulty coil is either a poor one or an old one, either of which should be replaced with a new coil in good condition. If the timer is worn, the parts may be replaced very cheaply, or an entirely new timer purchased at a nominal cost.

Defends Reversible Gear

Gopher Motorist Defends Opinions Attacked by Irreversible Adherent

SAUK CENTER, Minn.—Editor Motor Age—I am glad to welcome W. J. Marlin into the steering-gear arena, but we must assume for argument sake that Mr. Marlin has taken my article in Motor Age too seriously and that his explanation of his preference for the irreversible type proves that his argument is not very logical as applied to my proposition regarding the reversible type so much liked by those who have used the several kinds. Mr. Marlin says, "The irreversible steering gear is used by more manufacturers than any other type," which is true, but this really proves nothing from a logical using standpoint, as these same manufacturers also use many things from a mechanical view that are not what they should be.

Take, for illustration, the sliding gear-set, which has been called by the very highest mechanics "a mechanical monstrosity," but still the makers of motor cars use it. Does this fact that they use it prove it to be better than other forms of transmitting power to machinery? No; not a bit. The fact that has been advocated in Motor Age from time to time in reference to accessibility of parts, tire construction, etc., not only by the editorial department but by correspondents as well, has changed the mind of only one tire maker, so far as I am informed, who puts one ply more fabric in his tires, with many firms selling inner liners to make the tires safer and more durable, which would prove that they are not built as they should be. Still could one say, because the majority of tire makers used five plies of fabric eight plies were not better? One car manufacturer, who makes and sells thousands of cars yearly, uses exclusively the reversible type of steering gear, and could he not make the irreversible if he thought it best? Certainly. I did not mean street-car tracks in my article, but the tracks made by a motor car when toiling through mud nearly hub-deep; gumbo soil, which when dried acts like a rasp on the soft rubber. Any device which holds these same tires tightly to the sides of these ruts for a certain fact is far more expensive to the user than one which will slightly give a trifle, thereby saving the sides of the tires.

There is no disputing the fact that the reversible gear is much more easy to keep in order, and two to one, will wear three times as long as the irreversible type, all conditions being equal. And as for one riding a bicycle hands off and hitting a minute object in the road finds himself in the ditch is not argument against the gear of which I write, but this illustration was used to show the real easiness that is attending upon one who by the slightest touch of his steering wheel can guide his steed so accurately and with no effort to speak of.

The first car I owned was not of such very antiquated make for, indeed, the same company are today still making motor cars and as high in price as $4,500. Up here in the Gopher state we do not have as good roads, I feel certain, as they do in Mr. Marlin's state, so we like the quick-acting gear in the place of the old standby. Also we do not buy many $3,500 to $7,000 cars either, but we have one of the last named in our city, and it is rather slow in turning, but of course turns! I will bet Mr. Marlin a dollar anyhow, that if he will tour up into the Gopher state I will so please him with my reversible gear that when he returns to Pennsylvania he gets one of them—but will never let me know it—and will truly abandon the "awkward, clumsy" type of slow-moving gears!

Pray, Mr. Marlin, how are you to take up wear on the cogwheels used in their reversible type? I have seen adjustments on these gears, but like Flanigan and his money, the play was still in the steering gear, and we formed our judgment from the fact that the wheel would turn about 2 or 3 inches before it affected the forewheels of the car. One of these men who defends the irreversible type which is on his car blandly told me he liked to have the wheel turn 2 to 3 inches before it was effective because he could steer better! This same man can hit a telegraph pole or farm wagon about the easiest of any driver I ever met, and reminds me when I was driving an irreversible-geared car one night with a load of passengers. I ran over a bull, I am most certain that the irreversible was to blame for this ungentlemanly act. However, no one was hurt but the bull, a mudguard and a searchlight. I don't want any more irreversibles in it for me.—A. D Carpenter.

CHARGING WITH FORD MAGNETO

Loudenville, O.—Editor Motor Age—Some time ago I saw an article or an advertisement in one of the motor journals of a storage battery that could be charged from the magneto on a Ford machine, but cannot find it now. What is the address of the firm or firms that make such a battery?—H. J. Truscott.

The Ford magneto is an alternating current generator, and as such cannot be used to charge any type of storage cell. Either a direct current generator must be used as a current source in charging storage batteries, or the alternating current must be rectified. This may be done by means of a commutator on the generator armature, or with a mercury arc, or other type of rectifier. No rectifier now on the market is practicable for installation in a motor car, and Motor Age never has heard of installing a commutator in a Ford magneto. If you wish to charge a storage battery on your car, install a direct-current dynamo or magneto for this purpose.

The Realm of the

Chicago Department Stores to Use

About 1,600 Horses Will Be Displaced by Pending Haulage Change

By William B. Stout

DOWNTOWN Chicago department stores are planning to do away entirely with horses and substitute the motor truck for all delivery. In the list of those thus planning are Marshall Field & Co., Mandel Brothers, Carson, Pirie, Scott & Co., the Boston Store, The Fair, etc. About 1,600 horses will be displaced by commercial motor vehicles when the change is finally completed.

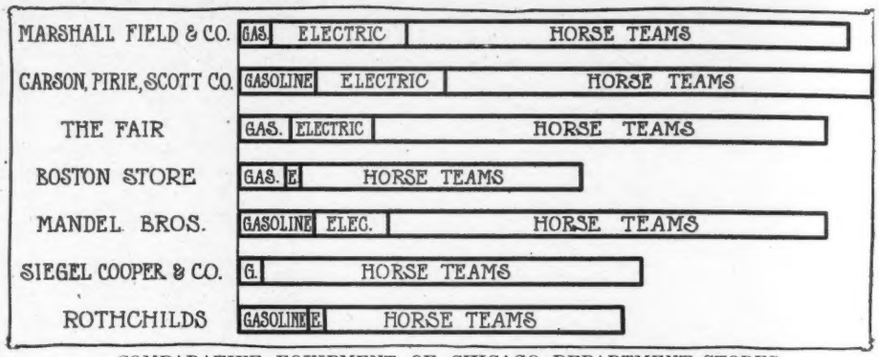
This will mean the operation of between 700 and 900 more motor vehicles than are at present in use in Chicago. Taking 750 teams and wagons from Chicago's streets and substituting motor vehicles will mean a saving of nearly 2 miles of street space, to say nothing of the gain in other lines of the city's progress.

Educating Chicago

For some time the various Chicago department stores have been using motor trucks. The first machines were of large tonnage and were used for hauling the heavy transfer loads from the main stores to the delivery substations north, west and south. The machines were put into use not with any thought of financial gain other than that resulting from better service. With the motor vehicle the load could leave the downtown store an hour later than was required of horsed wagons, and arrive at the shipping or distributing point in time to meet the small horse wagons there, at the regular schedule hours for delivery. Thus each truck saved 1 hour for each of three or four deliveries a day. This paid in service. After a time it was seen that if certain things could be done with the trucks to keep them continually moving that they could be made to pay actual dividends over horsed service.

Then it was that a few large gasoline cars were put in for furniture work, delivering bulk loads in house-to-house work. These trucks are now doing better in the matter of cost than any other machines in the department store service, some of them running 60 to 100 miles a day. One van for Marshall Field's is quoted at the latter figure.

When it was found that these machines were a success smaller ones were tried out by a couple of the firms, notably Marshall Field & Co., for the longer hauls to the suburbs. In this work loads were smaller so that small trucks were put to work. These running from 6 to 9 miles from the store before commencing deliveries then engage in house-to-house delivery work and have provided a success both as to service and cost. From 1 to 2 hours is saved on each delivery and with more reliability than was possible with horses, especially in winter work.



COMPARATIVE EQUIPMENT OF CHICAGO DEPARTMENT STORES

These machines did not prove a success in near-at-hand delivery, however. In fact, most of the downtown firms never even tried them out in this work, knowing from their own study and figuring that they could make better time with the horse equipments where so many stops and waits were involved. It was then that the electric vehicle began to be considered.

At first with these vehicles there was the great disadvantage of limited mileage, but this has now in part been overcome. Chicago is an ideal city so far as topography goes for the operation of electrics with their great weight since there are no hills and pavement stretches in all directions from the central district. True, some of this is poor paving but every year sees some improvement. With no hills and many good road surfaces with much of congestion as well to contend with, the electric has a good chance to make a showing over the gasoline car for the short hauls and many stops.

Trying Out Electrics

First trials were made of electrics by such firms as the Boston Store and Carson, Pirie, Scott & Co. The results were not at first what they should have been, but with the added experience of mistakes made, each firm which has tried electric trucks is planning to purchase more.

At first charging methods were wrong. Too much current went into the batteries for what was gotten out of them. Batteries were spoiled by misuse, drivers abused the cars on the road and by poor choice of routes and roads which used up too much current, had to be towed home. A few months of this, however, and each firm had a stock of information on what to do and what not to do, and a corps of drivers competent for the work.

Electrics in the house-to-house work near the stores proved a good investment and they were then put to work at the substations in package work.

Working in Outlying Districts

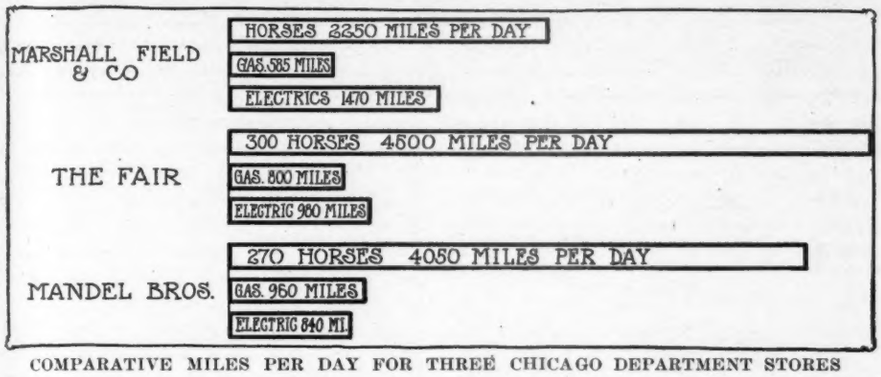
Carson, Pirie, Scott & Co. equipped their Evanston station 13 miles north of their store with electrics and tried them out. The result was so successful that this firm now is planning to do away with some 290 horses and substitute motor vehicles. Most of these will be electrics for house-to-house work. This firm also uses a 3-ton electric for the hauls to and from the store to the warehouse 2 miles away.

The heavy hauling to the substations is all done by gasoline cars. These run for an average of 6 miles from the store to the substations north, south and west and there the load is taken off and distributed to the wagons for the different routes. Originally horse vehicles of small size were in use for this final distribution and package work. Now electrics are planned for all of this except suburban work where fast gasoline cars of small tonnage will be used.

This firm is also using two three-wheeled motor cycle delivery vans for quick runs to the warehouse with rush

Commercial Cars

Motor Equipment Almost Exclusively



COMPARATIVE MILES PER DAY FOR THREE CHICAGO DEPARTMENT STORES

packages, etc. The chief difficulty is in getting drivers to operate them carefully over the rough cobble pavement between the store and warehouse. The first men through careless driving injured the vehicles. Carson, Pirie, Scott & Co. are in favor of very small, fast vehicles of this general type for the quick work, though four wheels would be an advantage on the rough roads.

Mandel Brothers have in service at present twenty-four gasoline cars, twenty-four electric machines and some horses. Some of the electrics have been operating for 3 years but the majority were put into service recently. Gasoline cars handle the substation and furniture work.

Electric Service Efficiency

For everything but the most congested routes the electrics pay handsomely and even there are successful on account of service efficiency and the advertising of up-to-date equipment. Mandel Brothers plan to have complete motor equipment within 2 or 3 years. The delay is only in arranging business conditions and allowing things to shape to the new systems without too great a revolution. More gasoline cars will be added for the bulk hauling.

Marshall Field & Co. are using in all fifty-one vehicles and 298 horses at the present time. Nine of these vehicles are gasoline and forty-two electric. The horses are to be entirely replaced, mostly by electric wagons of small size. This will mean the addition of some 150 motor trucks to their delivery fleet.

Field the Largest User

The nineteen gasoline cars now used pretty well take care of the long distance work of this form so that the bulk of the new machines will be for house-to-house delivery. This will mean electric equipment for the most part. This firm is at present the largest user of motors in the Chicago department store field.

The Fair has at present sixteen gasoline trucks, and twenty-six electric wagons in use with 300 horses. This firm also is enthusiastic over motor vehicles and as service conditions allow it is adding to the fleet. For the same reason given before probably three-fourths of the new machines will be electric vehicles, mostly of around 1,500-pound capacity and to be used for house-to-house work from substations.

The Boston Store is operating eighteen motor trucks, sixteen gasoline cars and two electrics. The installation of more electrics is planned on the completion of a new garage now building when more machines will be installed as a beginning toward the entire motorization of the delivery department. Electric wagons are favored for the house-to-house work and gasoline for long hauls.

Seigel, Cooper & Co. operate four 3½-ton gasoline trucks and no electric cars. Some 225 horses are used also in the house-to-house work. This firm is not yet convinced of the coming of the motored vehicle for this latter branch of work but is enthusiastic over the hauling of the big machines for transfer work and furniture hauling. The eventual motorization of this equipment would mean possibly 100 motor vehicles.

"We favor the gasoline truck," said the shipping clerk of this firm, "on account of its mileage capacity. It can do things impossible to the electric. For instance, we had a breakdown on the north side one afternoon. A big truck from Hammond got in about 4 p. m. and was sent north with a load at once. With an electric this would have been impossible. It would have had no charge for the trip. Again sometimes there is an extra bulk delivery like a talking machine and cabinet we sent out today. The gasoline truck can make a detour and deliver this at a point 1 mile west of the regular route. With an electric I couldn't do it on account of low mileage.

One Word for the Horse

"With horses on the house-to-house work too the driver is out and on the way to the door before the vehicle stops. With the motor he cannot do this. He has to stop the vehicle first. Of course I can send an extra boy."

The electrics are being watched closely for the package work and it is likely, according to those in charge, that electrics will be tried out. Judging from the experience of other stores in the same city this will probably mean their adoption.

Rothschild & Co. are using thirteen gasoline cars and two electric wagons. About 175 horses are operated in Rothschild's delivery work. Of the motor trucks three are used for transfer work, two for furniture hauling and the smaller cars for su-

From 700 to 900 Power Vehicles Will Be Added to City's Fleet

TRUCK EQUIPMENT OF CHICAGO DEPARTMENT STORES

Store or Firm—	Gasoline machines	Electric wagons	Horses used	Contemplated motor vehicles, approximated
Marshall Field & Co.	9	42	298	150
Carson, Pirie, Scott & Co.	24	41	290	155
The Fair	16	26	300	150
The Boston Store	16	2	190	95
Mandel Brothers	24	24	270	125
Siegel, Cooper & Co.	4	0	225	100
Rothschild & Co.	13	2	175	...

burban work. The firm is entirely satisfied with the work of the gasoline cars but is far from enthusiastic on the electric proposition.

It was stated that the machines were started on a 45-mile-a-day schedule but couldn't hold to it. They had to be towed in too often. At first the firm attempted to care for their own charging but soon found they could not make a success of it and turned the charging over to a garage. The lead batteries wore out too quick was also a claim.

It would seem that the fault here was in the handling of the batteries in the first place, injuring them and hence spoiling them for all time so far as original mileage is concerned. The cure would seem to be a new set of batteries and intelligent charging. Other firms are making 45 miles a day and more without trouble with similar vehicles.

The two firms last named are at the first stages of the final distribution of their packages by motor trucks. They are gaining experience gone through with by the stories further downtown a year or so ago and in the same length of time from now one can look for these firms too to state that they are planning the entire relinquishment of horse equipment and the adoption of motors.

USING REMOVABLE UPHOLSTERY

A taxicab-operating company in Chicago has recently received a number of Garford taxicabs, equipped with removable upholstery. The cushions, seat backs and sides, instead of being tacked to the back of the seats, are attached to boards which in turn are keyed onto the body. They may be instantly removed and cleaned by sponge or vacuum in a short space of time after each trip. It is thought this is the first time this idea has been used on American taxicabs, although in England removable upholstery is being used with success.

Motor Trucks in Mexico

Republic Offers Almost a Virgin Field, Which Affords Splendid Opportunities Because of the Antiquated Methods Used in Transporting Merchandise

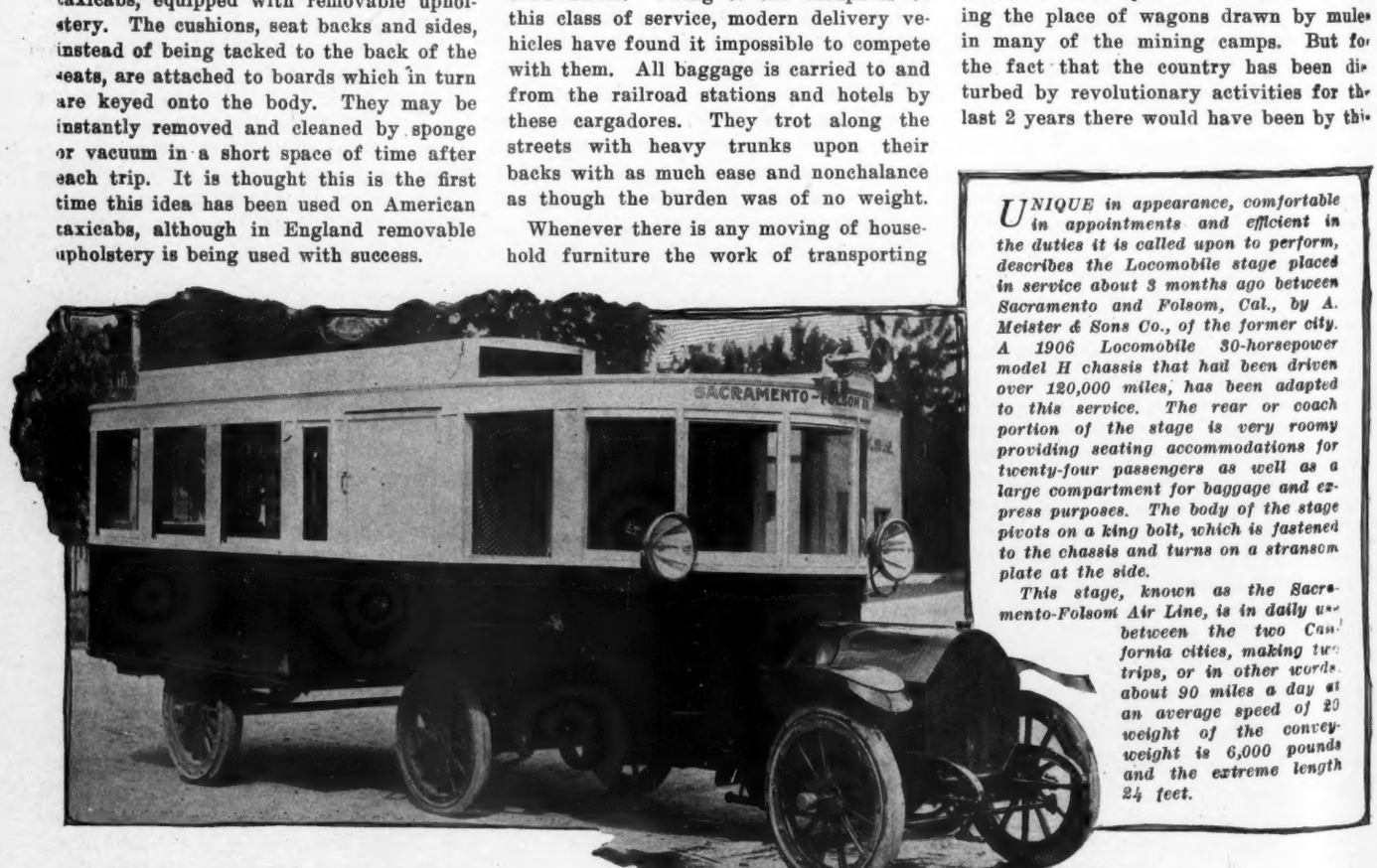
IN the City of Mexico, as well as in the other large cities of Mexico, motor trucks are just beginning to be introduced. It is a virgin field and is believed to offer splendid opportunities for this class of trade. While there is some difference of opinion among the manufacturers and concerns that would be expected to find use for this modern vehicle as to whether it can be made to serve profitably in place of the present cheap laborers that are almost universally used as a means of carrying burdens in the cities and towns of the country, it is the general opinion that motor trucks will be found so much more serviceable than the old method of transportation that they will gradually be adopted.

In Mexico the licensed carriers of burdens known as cargadores take the place of delivery and other kinds of hauling vehicles except for the very heaviest articles. These men are able to perform remarkable feats of strength and endurance in the matter of carrying loads upon their backs. Owing to the cheapness of this class of service, modern delivery vehicles have found it impossible to compete with them. All baggage is carried to and from the railroad stations and hotels by these cargadores. They trot along the streets with heavy trunks upon their backs with as much ease and nonchalance as though the burden was of no weight.

Whenever there is any moving of household furniture the work of transporting the articles from place to place is done by these men. Many of the largest stores even those of large trade, make deliveries by this means. It is this cheap manual labor that has so far prevented an extensive trade being done in this country in the matter of selling motor delivery wagons. It is thought, however, that even this hindrance to the trade will in time be overcome as the cities of the country become more modernized.

In the matter of heavy hauling such as is required by many manufacturing establishments and dealers motor trucks are better suited, it is claimed, to carry on the work expeditiously than the present manual method that is in general use. When it comes to heavy machinery it is impracticable for cargadores to handle the different parts, and what comparatively few trucks are now in use in the country are employed for this purpose.

The biggest field, however, for motor trucks' use in Mexico is that of hauling ore and supplies in the different mining districts. Already these vehicles are taking the place of wagons drawn by mules in many of the mining camps. But for the fact that the country has been disturbed by revolutionary activities for the last 2 years there would have been by this



MOTOR STAGE USED IN CALIFORNIA

UNIQUE in appearance, comfortable in appointments and efficient in the duties it is called upon to perform, describes the Locomobile stage placed in service about 3 months ago between Sacramento and Folsom, Cal., by A. Meister & Sons Co., of the former city. A 1906 Locomobile 30-horsepower model H chassis that had been driven over 120,000 miles, has been adapted to this service. The rear or coach portion of the stage is very roomy providing seating accommodations for twenty-four passengers as well as a large compartment for baggage and express purposes. The body of the stage pivots on a king bolt, which is fastened to the chassis and turns on a stransom plate at the side.

This stage, known as the Sacramento-Folsom Air Line, is in daily use between the two California cities, making two trips, or in other words about 90 miles a day at an average speed of 20 weight of the convey- weight is 6,000 pounds and the extreme length 24 feet.

time many motor trucks in use by different mining concerns.

Tentative orders for these vehicles have been placed and will be filled as soon as the country is restored to a state of tranquillity. There has been an evolution in the method of handling ore in the older camps. Originally the product of the mines was carried to the ore reduction mill or the railroad shipping point upon the backs of the peon laborers. In time this method gave way to the use of burros for the purpose and in many of the camps these patient animals are still serving as carriers of ore. Where it was possible to construct good roads it was found it was cheaper to haul the ore in large wagons pulled by mules and these latter are now being substituted by the modern motor truck. The evolution which has taken place in ore transportation is expected to be brought about gradually in the hauling of heavy articles in the towns and cities of the country.

During the last few years there has been inaugurated an era of street improvements not only in this city but in Guadalupe, Monterey, San Luis Potosi, Puebla, Tampico, Vera Cruz, Chihuahua, Torreon and a few other cities of the country. Many streets have been paved in these different cities and it is now possible for motor vehicles of all kinds to be operated with a degree of smoothness that could not have been done prior to the making of these improvements.

USEFUL IN OIL FIELDS

The oil fields of California show very conclusively a great saving the motor truck is making in modern transportation. Before the advent of motor trucks all of the hauling in the oil fields was done by six-mule teams, which cost the users of them $15 per day. These teams hauled from 3 to 3½ tons of material at a load.

Since the advent of the motor truck, the mule team has largely been displaced, inasmuch as it has been proved in innumerable cases that the modern motor truck is easily capable of doing the work of three such mule teams in 1 day and at a total cost, including all fixed charges, of less than the cost of one six-mule team.

One of the large users of motor trucks in the oil fields report that where formerly they had to keep a six-mule team on the road continuously to supply fresh water for their various camps, this work is now done by the motor truck in 2 days out of each week, leaving the balance of the time free for general hauling of supplies. The saving on the hauling of the fresh water alone amounts to about $44 per week, to say nothing of the large amount of tonnage hauled by the truck during the 4 other days of the week.

A CALIFORNIA COMPARISON

One of the best examples of the efficiency of the modern motor truck over horse-drawn vehicles is shown in a comparative statement of hauling by both methods in the construction of the new state highways in California.

In one particular piece of work the trucks average 96 miles of hauling a day, making twelve round trips and hauling 48 yards of crushed rock. In order to do this the trucks work 20 hours a day, with two shifts of drivers. The horse-drawn wagons, used in the same work, make only two round trips a day, or 16 miles, and haul a total of 8 yards of rock.

Owing to the heavy grades, some of which are 16 per cent, it takes a five-horse team to draw 4 yards of crushed rock at one load, and for such time the cost to the contractor is $10 a day for only hauling 8 yards. The motor truck, being an untiring animal, works 20 hours a day, hauls 48 yards of material, at a cost, including all fixed charges as interest, depreciation, etc., of less than $20 a day.

In a little over a month's work, one of the trucks on this particular job earned a gross return of $1,376. This amount of money represents an enormous amount of material moved during that period.

COST FOR 1 MONTH'S WORK

The Western Truck Co. of Tacoma kept an acurate account of the cost of operating a Kisselkar truck for the month of September, while hauling general freight, as follows:

148 gal. gasoline at 19c per gal.	$28.12
71 qts. of oil at 60c per gal.	10.65
Grease	.50
Wages of man and helper, part time	100.00
Interest, depreciation of tires, etc.	62.50
Total	$201.77

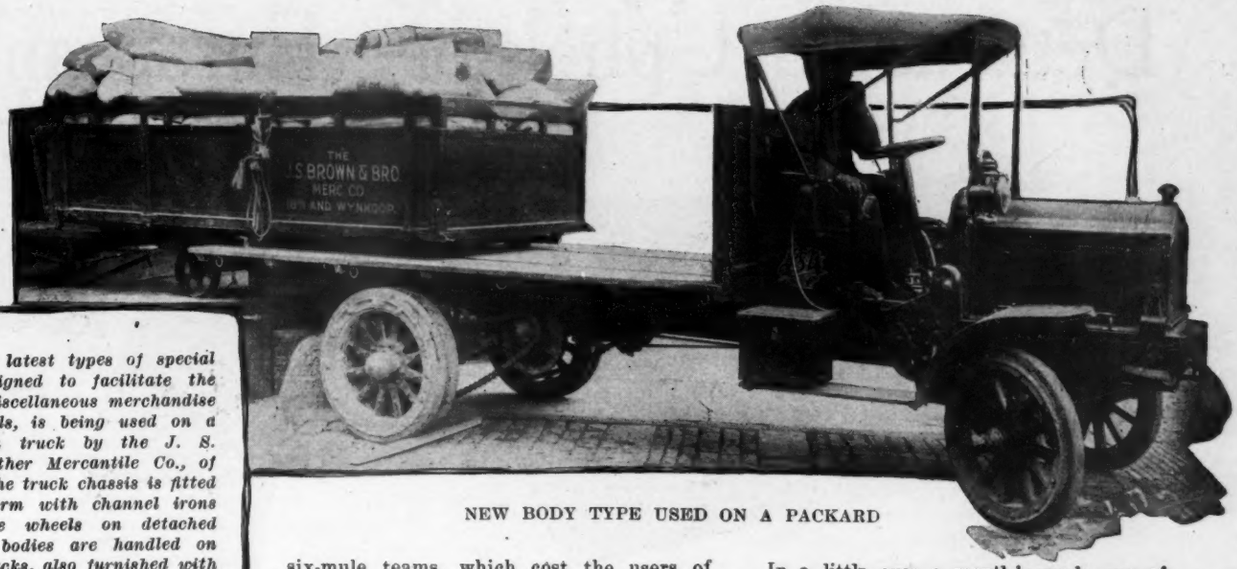
Cost per day, $6.71; total mileage, 1,204; average load, 4.5 tons.

NEEDED INFORMATION

"It is possible to give a pretty accurate idea of how motor haulage should work out in any man's business," says President George A. Kissel, of the Kissel Motor Car Co., "but it of course requires certain information on which to base estimates. Among the inquiries received there are a surprising number that ask for estimates of operating cost without giving any detail of the work in which the truck will be used. Now there are general facts of great interest that can be told of the motor wagon to any inquirer, no matter what his business may be, but to give figures and facts that will certainly apply to a particular proposition, the conditions and circumstances of that particular proposition must first be known.

"It is essential to understand where the truck is to be installed—nature of the roads as to hills and paving. Of course the daily delivery distances are necessary to learn, also the average number of stops. Then the nature of the load to be carried becomes important. Are the packages carried large or small—light or bulky?"

"If comparative figures between horse and motor haulage are desired, full information should be forthcoming as to the present horse haulage expense, including wages, feed, repairs, replacements and depreciation."

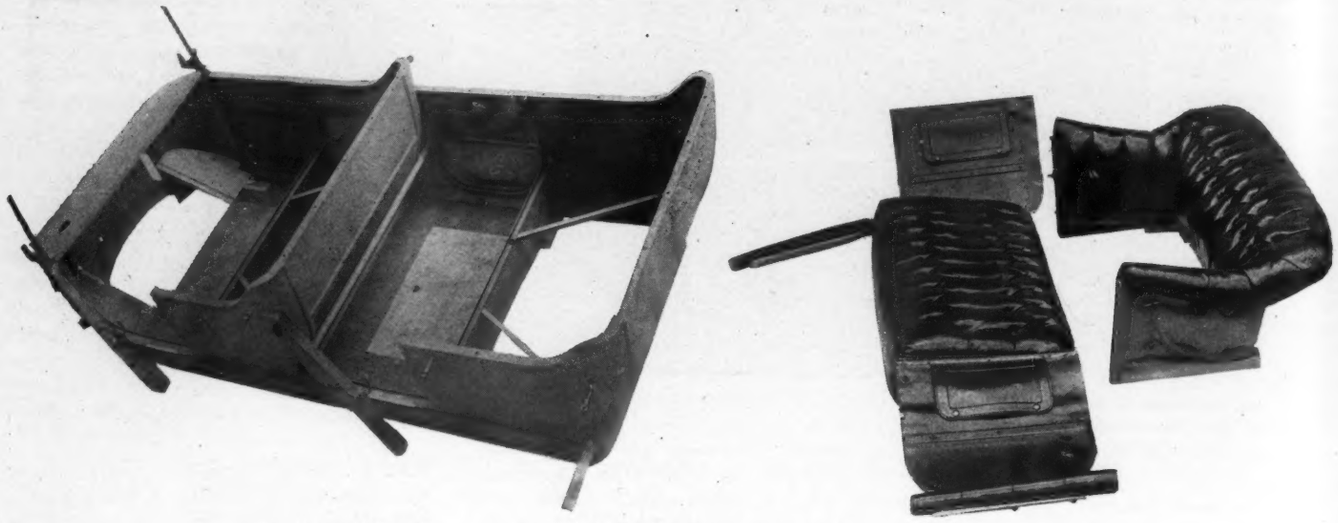


NEW BODY TYPE USED ON A PACKARD

ONE of the latest types of special bodies, designed to facilitate the handling of miscellaneous merchandise for short hauls, is being used on a Packard 3-ton truck by the J. S. Brown & Brother Mercantile Co., of Denver. On the truck chassis is fitted an oak platform with channel irons which fit the wheels on detached bodies. The bodies are handled on small push trucks, also furnished with channel irons corresponding to those on the truck platform. The loaded bodies are easily trundled into place and are conveniently unloaded by means of a hinged end gate. In the wholesale delivery of groceries the truck runs with very short intermissions.

This type of special body, like many others used in various lines of trade, largely increases the earning power of the truck. The Woeber Car and Mfg. Co., of Denver, supplied this body.

Detachable Upholstery European Idea



ALL-STEEL BODY AND DETACHABLE UPHOLSTERY USED ON THE B. S. A.

Adoption of All-Steel Body Brings About Change in Upholstering

By Charles J. Webb

WHILE the use of steel bodies no longer is a novelty in the United States it has remained for the Birmingham Small Arms Co., of Birmingham, Eng., to take it up in Europe. The British concern, however, has gone a step further—it has brought out detachable upholstery to go with the steel body, which, it is claimed, solves a big problem in the use of the metal body. The Englishmen like the new body, claiming that it has been possible to reduce the weight of the 1913 B. S. A. car 100 pounds by adopting the all-steel body.

One of the most difficult points, though, has been the question of upholstering the body. Being of steel, the upholsterer used to bodies constructed partly of wood finds himself at a loss where to drive his tacks, and, as a matter of fact, the question of upholstery has proved a really difficult one, until it was completely and at the same time neatly solved by the adoption of the detachable upholstery, made in accordance with Buck's patents.

Need of Detachable Upholstery

To realize some of these advantages one only need imagine that by some mishap a panel has been dented inwards. In the old body construction to repair this would mean the taking out of the best part of the firmly fixed upholstery in order to repair the mischief, and afterwards to replace it in the best way possible. To do repairs of this sort a very good upholsterer finds it necessary to replace it in a reasonable condition, while by having detachable upholstery all that is necessary is to slacken a small number of bolts, when the whole of the upholstery can be bodily removed from the body and replaced afterwards to its original form without injury in any way.

The fitting of the upholstery to the all-steel body is done in such a simple way that inside of say 30 minutes a four or five-seated car can be stripped entirely of its upholstery and replaced just as easily. Also the advantages of the all-steel body are the possibilities of standardizing and making interchangeable all body parts so that if through some accident some parts get damaged, the reference number of the defective part can be looked up in the company's catalog and the replacement ordered by telegram.

The method employed in fitting the upholstery is to prepare it in special jigs apart from the body proper. The trimming rails, instead of being permanent fixtures on the body, are made detachable, and the upholstery is fixed to these trimming pieces, together with the necessary trimmings, so that it can be applied to the body in a finished condition, and readily removed therefrom whenever required.

In making up the upholstery, the trimming rails or strips—with the fixing bolts in position—are placed in a dummy frame so they will be held in the relative positions they will occupy when the upholstery is applied to the car, and the upholstery then is attached to them in the ordinary way.

Applying the Upholstering

In applying the upholstery to the car, the bolts fastened in the trimming rails are inserted through holes provided in the top flange of the panels and the upholstery then partially turned up and the top rail is bolted down to the panel flange. The upper trimming piece having thus been fixed, the upholstery is turned down, and the bottom rails are clamped underneath the flanges, provided on the body frame, drawing thereby the upholstery to the requisite degree of tension, and finally strips of the upholstery are inserted behind the door flanges and fixed thereto by screws.

The construction of the steel part of the body is as follows: A skeleton framework is first erected, against which steel panels, sides and backs are fastened. The frame work consists of a bottom member of T section to which corner brackets made of aluminum castings are attached, together with cross members and dashboard angle irons. Those parts are erected as a skeleton frame and the side and back panels and the dashboard pressing either are bolted or riveted against the frame. The corner brackets are of such a shape that they make a curved connection between the side and back panels, so the latter are made of one single curvature only, thereby avoiding all the difficulties of beating and forming the body corners.

Each Side Panel a Single Piece

Each side panel is made in one single piece, and for the doorways the panel is provided with a narrow edge turned inwards onto which a strip is welded to make up the desired thickness of the doorway. This strip is provided on its inside with a beading rolled round a steel wire to give the required strength and stiffness to the door opening, also to act as a finishing edge and a stop to the door proper.

The side panels are provided on the bottom with a flange to bolt down on to the bottom frame member, and are provided on the top edge with a similar flange, on which the detachable upholstery is fastened. The back seat panels consist of sheet steel bent to the desired curvature and provided on the top and bottom with flanges for fastening down the panel and fitting on the trimming.

In using castings for the corners of the

body it becomes possible to provide these with the necessary lugs and projections for the fastening of fender stays, and top stays, which, as a rule, give great trouble to fix and to hold firm on the ordinary type of body.

The doors are made also entirely of sheet steel, having the door lapping pressed on to the door panel as one piece, a stiffening piece being swaged on to the door lapping to give the door the necessary strength and width required. By having the door panel and lapping in one single piece, the cracks which will show in the lapping joints of even the very best bodies are avoided.

Sheet Metal Cover on Door

For upholstery the door is provided with a sheet metal cover, in which the door pocket openings are pressed in in such a way that the trimming leather can be clamped by the bend over pocket openings, and between the cover and door proper.

Apart from the body proper there has also been great care bestowed to the finish of the steps and splash-guards. The step, instead of fitting it by means of brackets to the chassis and proving sparate splash-guards to fill up the gap, is made in this construction in one single piece. A strip of sheet metal is bent in such a way that it forms the splash-guards and step combined, and is strengthened by single irons, around which the sheet metal step is swaged. This step is fitted directly to the bottom member of the body, forming in such a way part of the same and making it independent of the chassis. Steel strips and steel angles are provided for fastening the step matting to the step.

The Four-Seated Body

In the four-seated body behind the front seat is a steel tube having its end flattened. This tube is fastened to the fixed portion of the bottom door hinge, and runs right across the body from one side to the other, acting as a stiffening member between the panel sides and at the same time as a foot rest for rear seat passengers.

The door hinges are of the usual type, but instead of being fastened on the outside face of the doorway and door edge, they are in this case slipped through a slot provided in the panels and the door front and are secured behind the turned inwards flange of the door and doorway, so that the fastening flanges of the hinges are invisible when the door is opened and only the hinge joints proper protrude out of the body.

The foregoing is a description of a four-seated body. For the two-seated type the same body frame and dash are used, and the side panels are modified accordingly.

SOUTH AMERICAN OUTLOOK

Washington, D. C., Nov. 2—A new field for the motor car, the richness of which has only recently been discovered by the American manufacturer, is rapidly being opened up in South America. The avidity which South Americans are showing for American cars is amply demonstrated by the fact that in June, 1912, more than 200 American-made cars were sold in Buenos Ayres, the New York of South America and the capital of Argentine Republic. There are now in use in Buenos Ayres as many motor cars, proportionate to the population, as there are in New York city.

Recently a salesman for an American car opened a garage in that city which has proved such a huge success that he is following it with a chain of such establishments. This salesman, who is a graduate of Princeton university, has obtained the services of a number of American mechanics familiar with the Spanish language.

It is stated that motor trucks are as yet unknown to South Americans and that American manufacturers would be sure of meeting with a brisk demand for this type of vehicle if they were to introduce their product. Motor trucks are desired not only by the big business houses of Buenos Aires and other cities, but also by the large ranch owners.

What the American car has done in South America in recent years is shown by the following brief skimming of the figures found in export trade statistics: These figures reveal the tremendous increase of sales of American cars to the richer of the South American republics as follows:

Argentina in 1907 bought thirty-nine American cars; in 1911, 343 American cars were sold in that country.

Brazil in 1907 bought fifty-two American cars, but in 1911 purchased 181 cars from the United States.

Uruguay—where the most remarkable development of the motor car trade has occurred—purchased in 1907 one American car, and in 1911 no fewer than ninety-six American cars were sold in that country.

The aggregate value of the cars sold in these three republics alone by American manufacturers during the year of 1911 was $795,418. Uruguay alone took American cars to the value of $147,142—and it is a good guess that half the American exporters of cars hardly know where Uruguay is. Argentine Republic now stands as the sixth best customer in the world for American cars, yet only a few years ago that republic was but a name to most American manufacturers.

Representatives of the state department and army officers who have been in South American countries recently declare that there is no reason why American manufacturers should not have the bulk of the business in those countries. Thousands of South Americans are rapidly growing rich, it is stated, and are reaching out for all the luxuries. With the rapid increase of good roads in the Latin-American republics, it is believed that a few years will show that the motor car business has not passed its infancy with the large sales already consummated.

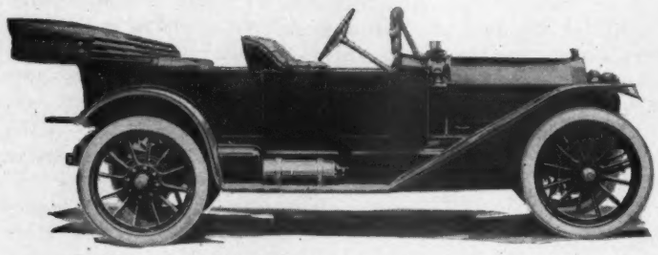
SYRACUSE TRYING BENZOL

Syracuse, N. Y., Nov. 2—It remained for the Semet-Solvay Co., of Syracuse, N. Y,. to introduce benzol, a by-product of coal tar oil, as a substitute for gasoline. Though known to Europeans, and in use to some extent over there for 4 years, it was only introduced on this side a month ago by the Semet-Solvay Co. It is obtained from its coke retort ovens. As the only refining plant is in Solvay, near Syracuse, car owners of this city have the first chance to experiment with the new propelling medium.

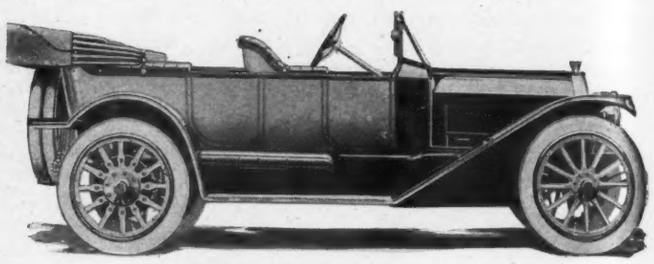
Benzol is a water-white liquid of a fairly high specific gravity and bears the same relation to coal oil that gasoline does to petroleum. Like the common motor fuel, the principal expense is the refining. It is claimed that benzol will not cause carbon deposits, but will on the contrary remove all such coatings. It is also claimed that benzol will give 30 per cent more mileage than the present grade of gasoline.

SIDE AND REAR VIEW OF B. S. A., GIVING AN IDEA OF APPEARANCE OF ALL-STEEL BODY

Larger Six Added to Havers Line

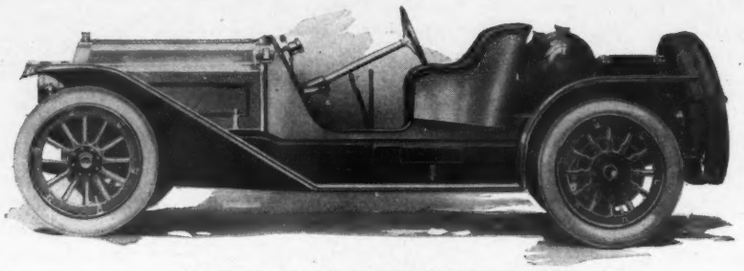


HAVERS SIX-44 TOURING CAR FOR NEXT SEASON



HAVERS MODEL SIX-55 FOR 1913

CONTINUING its former six-cylinder model and adding another and larger chassis to its line, the Havers Motor Car Co., Port Huron, Mich., enters the 1913 selling season as an adherent to six-cylinder design alone. The new model, which, like the older type, will have two body designs—a roadster or speedster and a touring car—is designated as model Six-55, the last figure representing the horsepower rating. The smaller model is known as model Six-44, and aside from a number of detail refinements it remains the same as last season.



HAVERS SIX-55 KNICKERBOCKER SPEEDSTER

Details of New Model

While the new chassis is longer, its wheelbase being 128 inches and that of the Six-44 being 122 inches, it adheres strictly to Havers design as embodied in the previous six. No differences of note are to be found in the two chassis, the new model having a larger motor and where necessary its parts being of larger size than those of the Six-44.

The equipment of the new car is most complete, including a combination electric lighting, starting and ignition system in addition to all other requirements for immediate road service.

With these facts before the reader, Motor Age will, for the sake of simplicity, confine itself to a description of the new six, bringing out wherein the two models differ, and remembering that these differences are only in size so far as the design is concerned.

The smaller motor has a bore of 3¾ inches and a stroke of 5 inches, giving a rated horsepower of 33.75 S. A. E., while with dimensions of 4 by 5 inches, bore and stroke, respectively, the larger motor has a rating of 38.4 horsepower, S. A. E. formula. With this long stroke the motors are plainly under-rated by the latter, and the factory ratings are set at 44 and 55 horsepower, respectively, as indicated by the model designations.

The cylinders are cast in pairs and are of L-head design, and the valve stems and springs are completely inclosed by aluminum cover plates. Valves are on the left side, and they have a diameter of 1¾ inch. The intake ports of each pair of cylinders have a common opening into the manifold, while there is an individual passage from each exhaust port to the exhaust manifold connection. This will be evident from an inspection of the motor illustrations.

The pistons are provided with oil grooves below the piston pins and bosses, which, together with the relief holes, distribute the oil to the cylinder walls and aid in the escape of surplus lubricant. Each piston has three compression rings. The connecting rods are drop forgings of liberal dimensions. They are provided with adjustable, die-cast, nickel-bronze split bushings at their lower ends, which are shimmed in place.

The crankshaft has four bearings which are fastened to the upper half of the crankcase, as in average practice. For the larger motor the bearing lengths are 4 inches for the rear, 3 inches for the two center and 3½ inches for the front bearing. The lower connecting rod bearings have a length of 2⅝ inches. The flywheel bolts to a flange which is integral with the crankshaft. Like the crankshaft, the camshaft has four bearings, which are of ample size. The cams are integrally forged with the shaft. Timing gears are of helically-cut type and of steel.

HAVERS DASH EQUIPMENT

A combined force-feed and splash lubrication system is used. The oil is forced by a gear pump from the reservoir which is cast integral, with the lower half of the crankcase through a distributing channel in the upper half of the crankcase to the main bearings and to the gears. Grooves carry the excess oil from these points to the oil troughs, where it is dipped up and splashed to all parts of the motor by the connecting-rod ends. There is an individual trough under each connecting rod. The oil eventually finds its way back to the reservoir, from which after being strained, it is again conveyed to main bearings and gears.

Thermo-syphon cooling is employed, no circulating water pump being used. There are two connections from the water outlet manifold at the top of the cylinders to the radiator, which is of the cellular type. The waterjacket space around the cylinders is ¾-inch thick. Cooling is aided by the ordinary type of fan between motor and radiator, which fan is belt-driven from the magneto shaft. There is an adjustment for tightening the fan belt. Water enters the cylinder jackets at the right side of the power plant.

Electric Starting, Lighting and Ignition

Model Six-55 makes use of a combined starting, lighting and ignition system, which is the product of the North-East Electric Co., Rochester, N. Y., while the Six-44 utilizes the Bosch dual system, an acetylene starter being fitted as part of the regular equipment. The magneto is carried on a bracket integral with the upper half of the crankcase on the left side. It is gear-driven from the crankshaft

through a magneto shaft in the usual way. On the Six-55 the generator-motor is carried on the opposite side from that of the magneto on the smaller engine. The generator-motor is on the intake side and at the rear so as to be close to the flywheel, to which it is geared. In connection with the system a storage battery is used, as well as starting and lock switches.

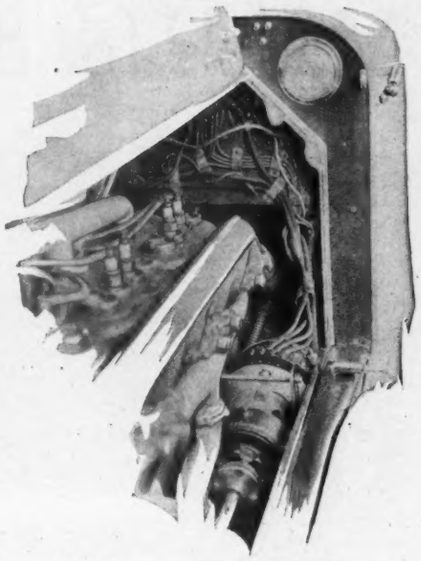
Self-Regulating Generator

The storage battery performs the usual function of furnishing starting current, driving the motor-generator as a motor and revolving the crankshaft. The battery, which is the recipient of all energy generated in excess of that needed for lighting and ignition, also furnishes current for lighting the lamps when the engine is running at a speed too low to cause sufficient energy to be generated by the motor-generator and when the car is not running. The generator has no governor or other device to regulate its speed, an automatic gear arrangement providing the proper gear ratio between engine and generator at all speeds of the former.

The carbureter is of Stromberg make and is located at the center of the left side of the power plant. The fuel is carried in a 20-gallon tank under the seats.

The clutch is a multiple-steel disk type, alternate plates of which are lined with raybestos. The gearbox bolts directly to the flywheel housing, as in accepted unit power plant design. Cover plates permit of free access to all the gearset mechanism. The transmission has three speeds forward and reverse and is of selective type. The main driveshaft and the countershaft are carried on annular ball bearings. Gears are of chrome-vanadium steel, heat-treated and case-hardened. They have wild faces and are of a good diameter.

Power is conveyed to the rear axle by a nickel-steel driveshaft having a diameter of 1½ inch. It is inclosed in a torque tube, which has two arms at its front end fastening to a cross member of the frame. The rear end of the tube bolts to the rear axle housing. One universal joint is found just back of the gearbox, where also is located a slip joint on the transmission shaft. The



POSITION OF ELECTRIC GENERATOR

driving strain is carried through radius rods, while torsional strain is taken by the frame through the agency of a large yoke on the third member. The rear axle is of the floating type.

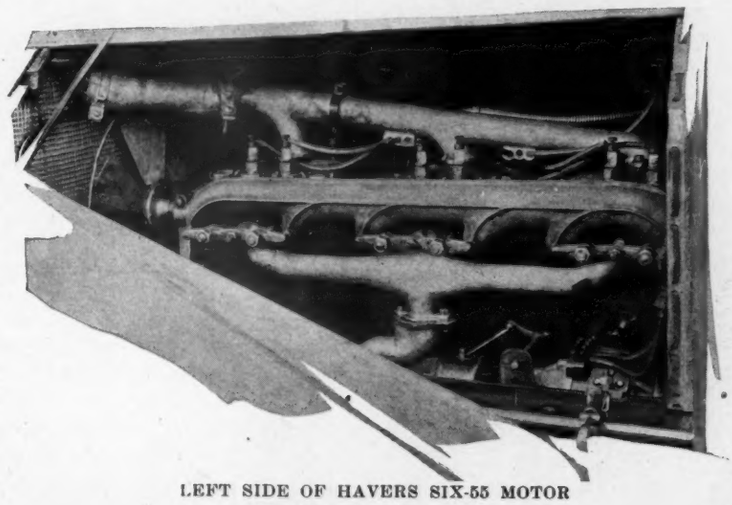
A drop-forged I-beam type of front axle is used, the yokes being similarly manufactured. The frame is of the so-called double-drop design, constructed of pressed steel of heavy channel section.

Springs are semi-elliptic in front and have a length of 40 inches. They are 2 inches in width. The rear spring suspension is of the platform type—that is, there are two half-elliptic side springs and a cross-spring in the rear of the frame.

The rear side springs are outside the frame, at shackle to it only at the front ends, their rear ends fastening to the ends of the inverted rear cross spring, which fastens rigidly at its center to the rear cross member of the frame. These rear springs have dimensions of 36 by 2 inches.

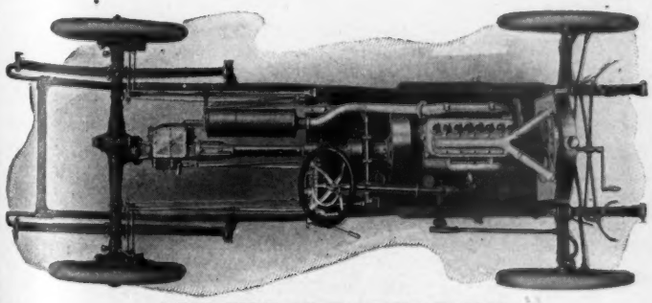
The control is one the right, the gear shift and emergency brake levers being at the driver's right, but inside the car body. The steering gear construction is of the worm-and-full-gear type, making possible the simple adjustment for wear. The steering gear is irreversible. The steering column is of nickel and has a diameter of 1¾ inch. The control is standard in all its features, consisting of brake and clutch pedals, accelerator and H-gate gearshift.

The arrangement of the various control devices on the dash is shown herewith. The muffler cutout is seen at A, while the accelerator, which is of peculiar form, appears at B. Instead of being the kind which is pressed down to admit more gas to the cylinders, this accelerator lever is moved in a horizontal plane, the lever being moved around its center as an axis in much the same manner as the throttle lever on the steering wheel is moved, the only difference being that when the accelerator arm is released it returns to its original position just as any other type does. The lock ignition switch is shown at C, the sight feed of the oiling system at D, the speedometer at E, and its pilot lamp at F. The aim has been to make all the dash apparatus as accessible as possible to the driver.

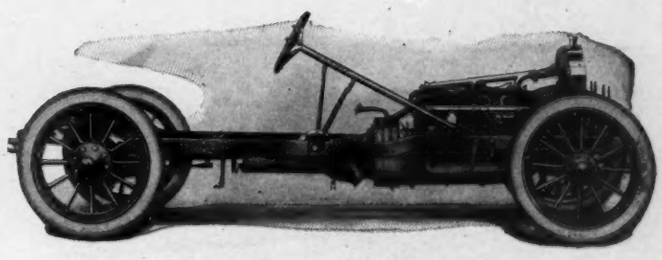


LEFT SIDE OF HAVERS SIX-55 MOTOR

The Knickerbocker speedster, so-called, is worthy of more than passing mention in that it is a new effort for the Havers company, which believes that there is a demand for a machine of this type, built along attractive and racy lines. The gasoline and oil tank is carried back of the seat. Back of the tank is the trunk for supplies or clothing, and in the rear the spare tires are mounted. The equipment consists of Gray & Davis black and nickel lamps, mohair top with patent inside curtains, ventilating windshields, horn etc.



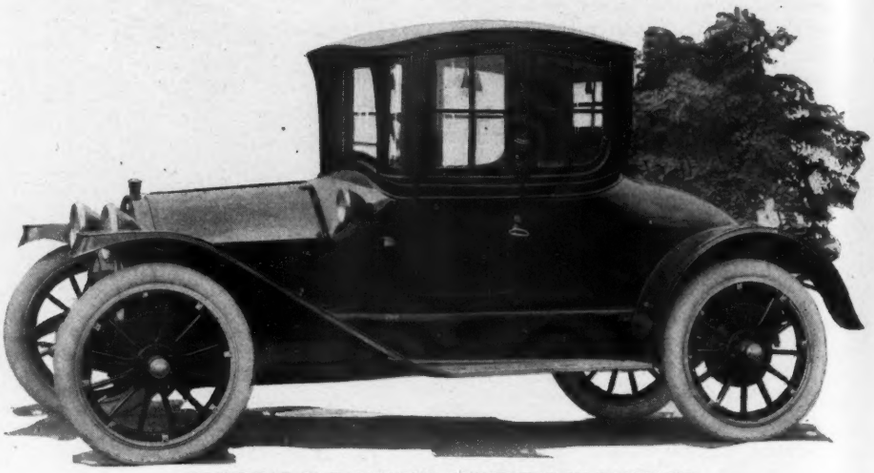
TOP VIEW OF HAVERS CHASSIS



SIDE VIEW OF HAVERS CHASSIS

Four Klinekar Models for Season of 1913

KLINEKARS appear for 1913 nominally in four chassis models, the same as in 1912, though in reality there are six different chassis, the two extra ones being the two Meteor models which are the same as the 6-60 and the 6-50 except that they have a wheelbase of 110 inches and slightly different sized tires. The line is known as the Series A. A few minor changes have been effected in the way of refinements in promoting silence and ease of mechanical operation and comfort in riding. A special body type which is practically new to the industry also has been brought for the new year. This is a combination coupe and roadster, the coupe top being removable in 10 minutes, leaving a fully finished torpedo runabout of distinctive appearance. This body is furnished on the 4-40, 6-50 and 6-60 chassis, the only model of the line for which it is not adaptable being the 4-40 chassis.



KLINEKAR DETACHABLE COUPE TOP IN POSITION

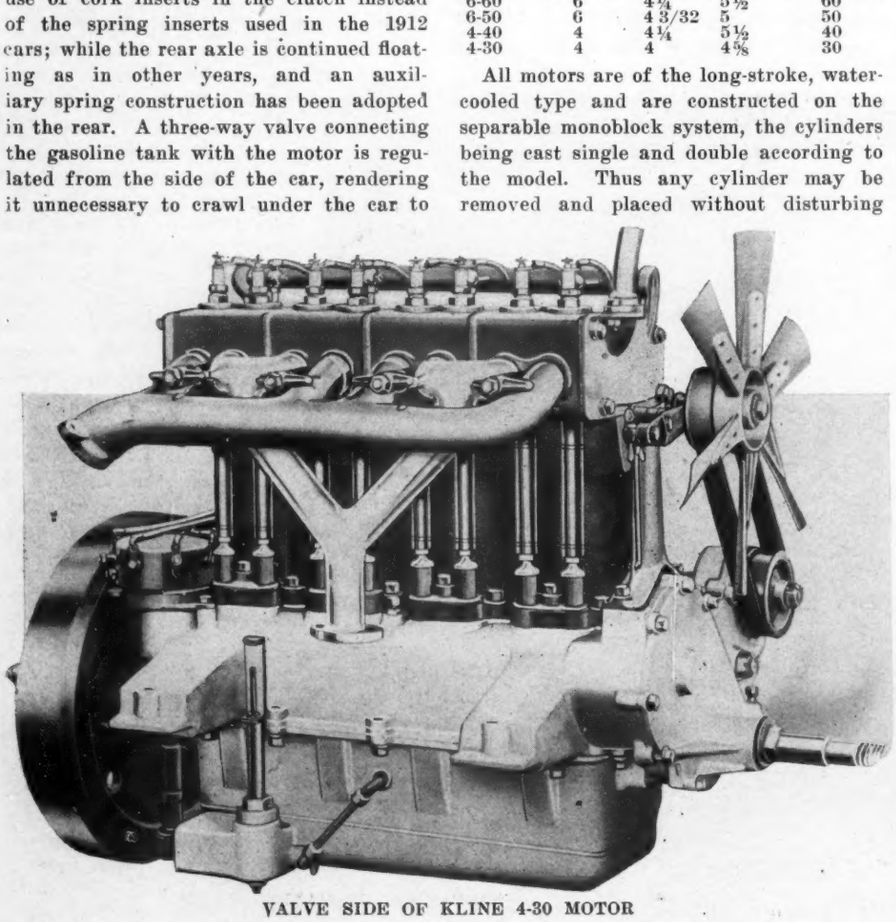
Minor Mechanical Modifications

Mechanical changes in the Klinekars for the coming season are all of a minor nature, the new features being: The inclosing of both intake and exhaust valves on all motors: the addition of a Rushmore dynamo for the electric lighting system; the adoption of the Ever-Ready automatic mechanical starter; some slight modifications in the sizes of springs and tires; use of cork inserts in the clutch instead of the spring inserts used in the 1912 cars; while the rear axle is continued floating as in other years, and an auxiliary spring construction has been adopted in the rear. A three-way valve connecting the gasoline tank with the motor is regulated from the side of the car, rendering it unnecessary to crawl under the car to change the fuel connections. All bodies for the 1913 cars are made in the Kline shops and are of combination steel and wood instead of semi-aluminum as in 1912.

There is no change in any of the motors beside inclosing the valves. The horsepower of all motors is calculated at 1,200 revolutions per minute, except the 4-30, which is taken at 1,100 revolutions per minute. The dimensions of the various motors are as follows:

Models	Cylinders	Bore	Stroke	Horsepower
6-60	6	4¼	5½	60
6-50	6	4 3/32	5	50
4-40	4	4¼	5½	40
4-30	4	4	4⅝	30

All motors are of the long-stroke, water-cooled type and are constructed on the separable monoblock system, the cylinders being cast single and double according to the model. Thus any cylinder may be removed and placed without disturbing the others, it being possible to take out the cylinders separately without removing the motor from the car, or the cylinders can be removed as a unit. Should a new cylinder be needed, it can be substituted for the old one without disturbing the rest of the motor. As each cylinder is opened at either end it is possible to obtain a large and well-gauged water space between the cylinder and the waterjacket. After the cylinders have been machined, they are bolted together with six bolts made of special stock designed to resist rust. These run through the waterjackets, the joints being made tight by paper gaskets, while the opening between the cylinders does away with water pipe connections between them, as shown in the accompanying illustrations of the various motors. As the water enters at the forward end of the motor and is forced out of the waterjacket of the rear cylinder up to the radiator, moreover, this has the advantage of insuring free circulation. Contrary to the general application of the monoblock system, there is a bearing between each cylinder, designed to render the motor much more rigid while at the same time making the construction lighter. Thus the motors have five and seven bearings, respectively.

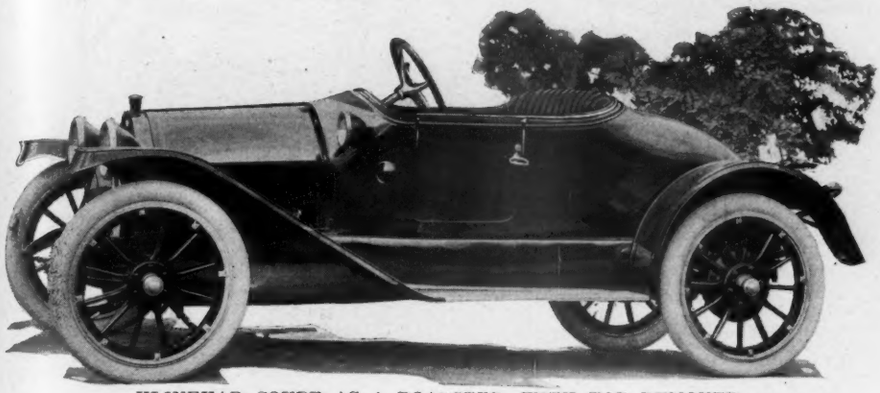


VALVE SIDE OF KLINE 4-30 MOTOR

Inclosed Valves Adopted

A feature of the 1913 cars is the fact that all valves are inclosed, as shown in the accompanying illustrations of the various motors. The valve casings are of aluminum, entirely dust-proof and easily removable. All valves are interchangeable. The heads of the valves are of nickel steel and are of large diameter. Integral stems, carbon steel accurately ground, are used. The valves are operated by a drop-forged camshaft with cams keyed and pinned. They are case-hardened and ground to size. The camshafts are housed in the crankcase. The push rods used are of the sliding type with large bearing surfaces, the adjusting nuts being

New Convertible Coupe Is Introduced



KLINEKAR COUPE AS A ROADSTER, WITH TOP REMOVED

drilled and fiber inserted. This, of course, renders the rods silent in operation and provides a sliding contact on the cam practically without friction.

Motors are mounted on a three-point suspension, except the 4-30, which is mounted on a subframe. The crankshaft used in all motors is of special carbon steel, drop-forged and double heat-treated, all bearing surfaces being ground to exact size. Crankshaft bearings are of Parson's white brass and all are adjustable. Connecting rods are of drop-forged nickel steel. Crank-pin bearings are bushed with Parson's white brass, while the piston-pin bearings are bushed with Cramp's special bronze.

Novel Engine Support

A special aluminum casting is used for the crankcase, the forward supporting arms being cast integral on all models, with the exception of the 4-30, which, being mounted on a subframe, requires different construction. The half-time gearcase forms an integral casting with the engine base and entirely incloses the gears, insuring protection from grime and dust. The bottom section of the crankcase contains an oil reservoir and is easily removed for the purpose of making adjustments or inspecting the crankshaft, connecting rods, or main bearings.

Two separate systems of ignition are used, the first consisting of dry batteries and a single-unit coil on the dash with a switch on the steering column, except on the 4-30, with high-tension distributor and separate spark plugs, while the second comprises a high-tension magneto with a separate set of spark plugs.

Lubrication System

The splash system is used for the lubrication of all motors, the oil being carried in the lower part of the crankcase, which has a capacity of about 2 gallons, and which is divided into four or six troughs, depending upon the number of cylinders of the motor. These divisions consist of the horizontal partition which forms the bottom in the lower half of the crankcase, together with the vertical partitions designed to keep the oil from running to one end of the crankcase when the car is on a grade. The partitions insure ample lubrication under all conditions, provided, of course, that the proper oil level is maintained in the crankcase. The splash system is of the constant level type and is readily adjustable by levels inserted in the side of the crankcase. These levels have a micrometer adjustment and the level can be raised or lowered, according to the lubrication requirements of the motor.

A gear-driven oil pump delivers the oil from the base reservoir to a sight-feed on the dashboard. All the oil passing through the lubrication system of the motor must go through this sight-feed in full view of the driver, who is thus enabled to tell exactly the condition of the oiling system. From the sight-feed the oil is led to the crankcase, where it enters the distributing pipe leading to the splash troughs in the upper part of the crankcase. The lubrication of the ignition distributor is effected by means of an oil bath, the vertical distributor shaft being lubricated by the splash from the crankcase.

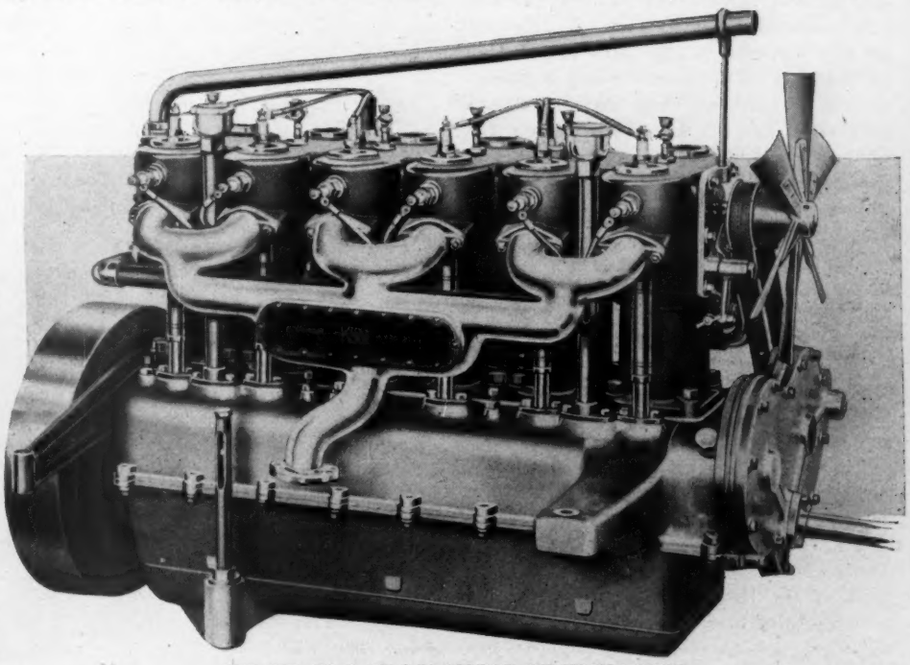
Cooling of the motor is effected by means of a gear-driven centrifugal pump forcing the water from the radiator up through the waterjackets and back to the radiator. The radiator is of foreign design, being of the flat tube type, of large capacity and substantial construction. The pump case is bolted to the crankcase, insuring permanent alignment. The auxiliary cooling system consists of a ball-bearing fan bolted to the forward end of the motor and driven from the pump shaft by means of a belt which may be readily adjusted to the proper tension.

The clutch is of the leather-faced, non-burning variety. The clutch is provided with a ball thrust contained in the dustproof housing. A heavy spring released through the action of a yoke acting on a ball thrust ring holds the clutch in engagement. As soon as the clutch is disengaged, its rotation is stopped by a clutch brake. This tends to render gear-changing noiseless.

Double Universal Joint

A special feature of the Klinekar is the design of the double universal joint between the clutch and transmission, which instead of sliding to release the clutch, as in common practice, has an arm or spider mounted on the main shaft and connected in the clutch with blocks and pins. This promotes easy engagement. The joint is fitted with a metal grease-proof covering and is so constructed that it may be lifted out after removing the bolts which hold it in place, thereby giving free access to both clutch and transmission without further complication.

The Rushmore dynamo, driven by a



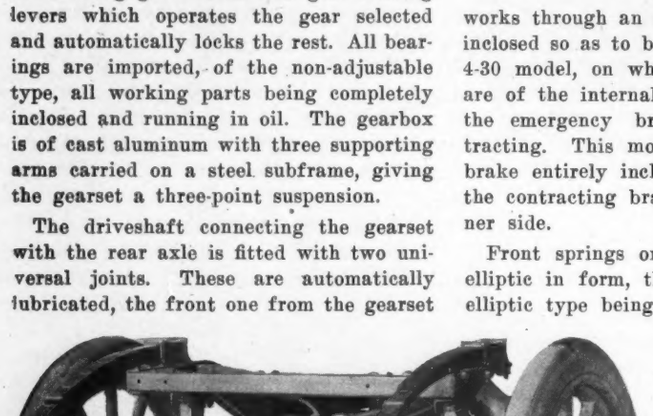
INTAKE SIDE OF 6-50 MOTOR OF KLINE LINE

silent chain from a gear on the main drive shaft just in front of the gearbox, is mounted on an extension of the subframe supporting the gearbox.

Four-Speed Gearset

The gearset is of the sliding gear selective type. It has four speeds forward with direct drive on third, being geared up on fourth speed. All speeds are obtained by single lever from the right side through an H-quadrant. The gears and shaft used are of heat-treated alloy steel. The bearings are imported and are of the annular ball variety. When changing gears, a sliding movement to either right or left engages one of the gear-shifting levers which operates the gear selected and automatically locks the rest. All bearings are imported, of the non-adjustable type, all working parts being completely inclosed and running in oil. The gearbox is of cast aluminum with three supporting arms carried on a steel subframe, giving the gearset a three-point suspension.

The driveshaft connecting the gearset with the rear axle is fitted with two universal joints. These are automatically lubricated, the front one from the gearset



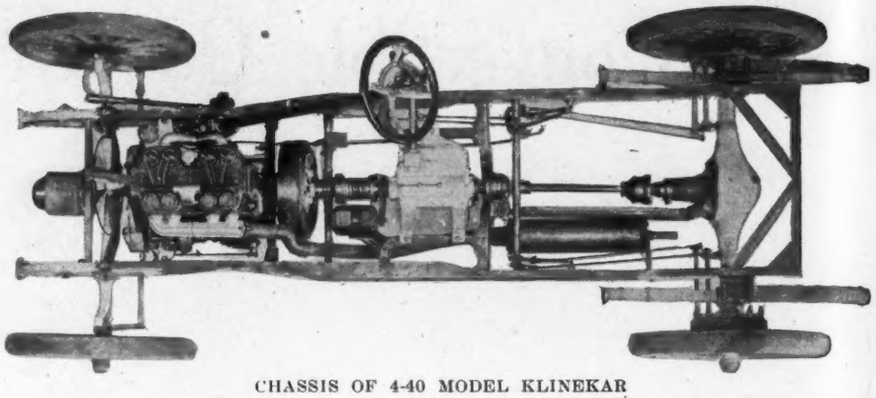
ONE-PIECE REAR AXLE USED ON KLINEKARS

and the rear one from the differential, and are protected from water, dust and dirt by steel covers. A slip joint is provided at the end of the shaft, being arranged so that it lies practically horizontal, thus preventing end thrust and wear on the joints by the movement of the body and flexions of the frame when the car is running over rough roads.

Floating Rear-Axle

The rear axle on all models is of the floating type, the bevel gears, differential and live axle being contained in a one-piece pressed steel housing except on the model 4-30, on which it is divided in the center. All moving parts of the differential and rear axle run on non-adjustable ball and roller bearings. The large differential and small bevel gears and bearings may be lifted directly out of the axle housing without disturbing any adjustments, except on the model 4-30, which requires only the separation of the two parts of the housing.

Two sets of brakes, both of the expanding type, are operated on drums on the rear axle by means of cams. Each set



CHASSIS OF 4-40 MODEL KLINEKAR

works through an equalizer and both are inclosed so as to be dustproof, except the 4-30 model, on which the service brakes are of the internal-expanding type, while the emergency brakes are external-contracting. This model has the expanding brake entirely inclosed in the drum and the contracting brake inclosed on the inner side.

Front springs on all models are semi-elliptic in form, the three-quarters scroll elliptic type being used on the rear, the only exception to this being the 6-60 and 6-50 Meteor special speed car, on which semi-elliptic springs are used all around. The front springs on all models are 36.5 inches, while the rear springs are 47 inches, except in the case of the Meteor, which has 50-inch rear springs. The wheelbase of the 6-60 has been increased 2 inches over 1912. Wheelbases and tires of the various models are as follows:

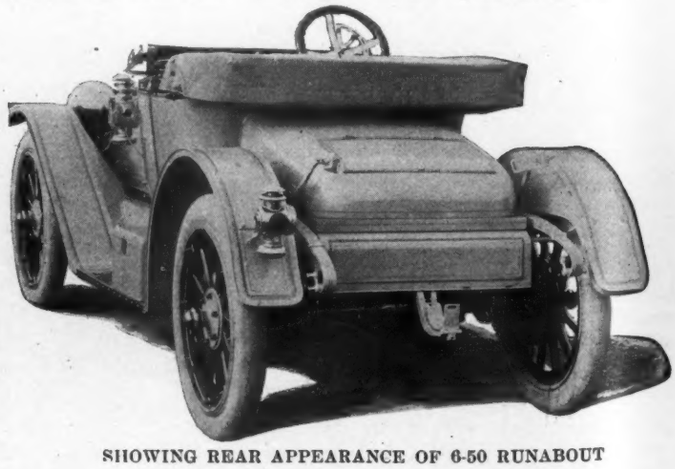
	Front Tires	Rear Tires	Wheelbase
6-60	37x5	37x5	132
6-50	36x4.5	36x4.5	126
Meteor	36x4	36x4	110
4-40	36x4	36x4	118
4-30	34x4	34x4	115

Combination steel and wood bodies of flush-side design are used in the 1913 cars instead of semi-aluminum. The 6-60 is furnished in touring car, toy tonneau, runabout and coupe roadster style, the passenger capacity ranging from two to seven, and the road speed from 55 to 65 miles an hour. The 6-50 also comes in these styles, as does the 4-40. The 4-30 is furnished as a touring car, to tonneau and roadster only. The Meteor is a special two-passenger creation mounted on the 6-60, 6-50 or 4-40 chassis, capable of 65 to 70 miles per hour.

Novel Coupe Body

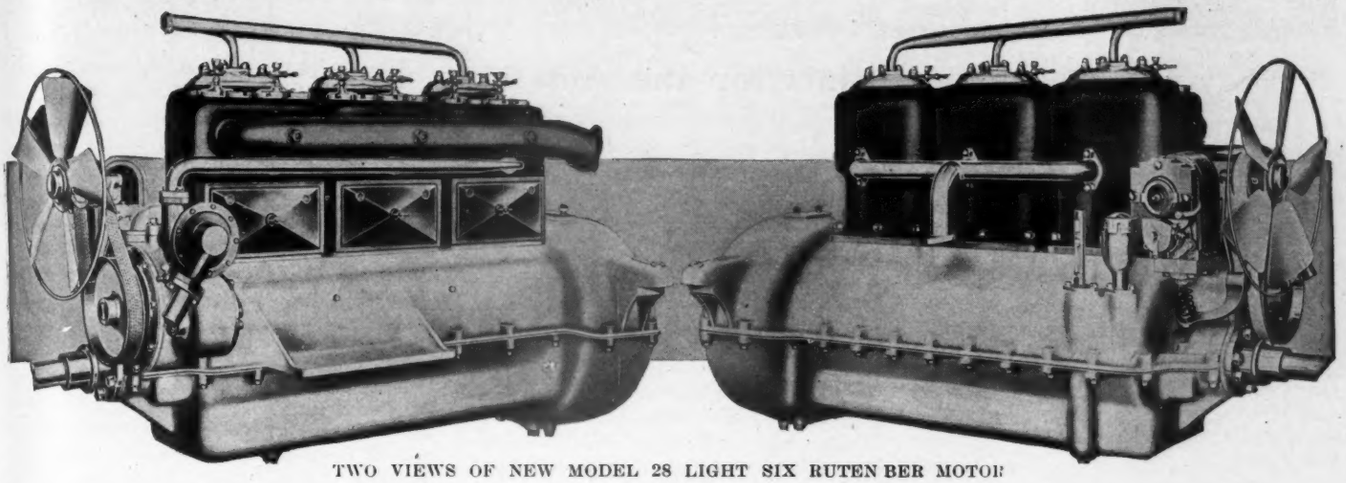
An addition to the 1913 line of the Kline company is the coupe roadster illustrated. One view shows the canopy top in position, making the car a coupe, while another shows the top removed, leaving a comfortable, commodious roadster of the torpedo type. The mechanical specifications of this car are the same as the other 4-40, 6-50 or 6-60 models, as this is simply a special body mounted on the regular chassis. The detachable coupe top is mounted on the parapet of the roadster so cleverly that the joint is invisible, giving it the appearance of a one-piece body. The top has two large doors, one on each side, and the windows are made in either plain or colonial style, the latter being illustrated. The front glass is adjustable and the windows may be lowered to any height desired. With the top mounted, two large doors are used, for which smaller doors are substituted when the car is used as a roadster. The operation of detaching the top requires only 10 minutes, it being held by seven bolts.

The equipment on all cars except the 4-30 includes semi-duquesne silk mohair top, side curtains and dust hood; adjustable clear vision windshield, tire irons; Firestone universal demountable, detachable rims; Rushmore lighting dynamo; Ever-Ready mechanical engine starter; speedometer, etc.



SHOWING REAR APPEARANCE OF 6-50 RUNABOUT

Reorganized Rutenber Product Refined



TWO VIEWS OF NEW MODEL 28 LIGHT SIX RUTENBER MOTOR

TWO new models are announced by the Rutenbur Motor Co., successor to the Western Motor Co., Marion, Ind. These motors, a four and a six, are both in many respects different from former models of this manufacture. The leader of the new line is model 28, which is a six-cylinder type, with cylinders cast in pairs. The bore is 3¾ and the stroke 5¼ inches. The motor is of the unit power plant type, the crankcase extending back to inclose the flywheel. The motor is of the L-head type, with both inlet and exhaust valves side-by-side, on the left side of the motor.

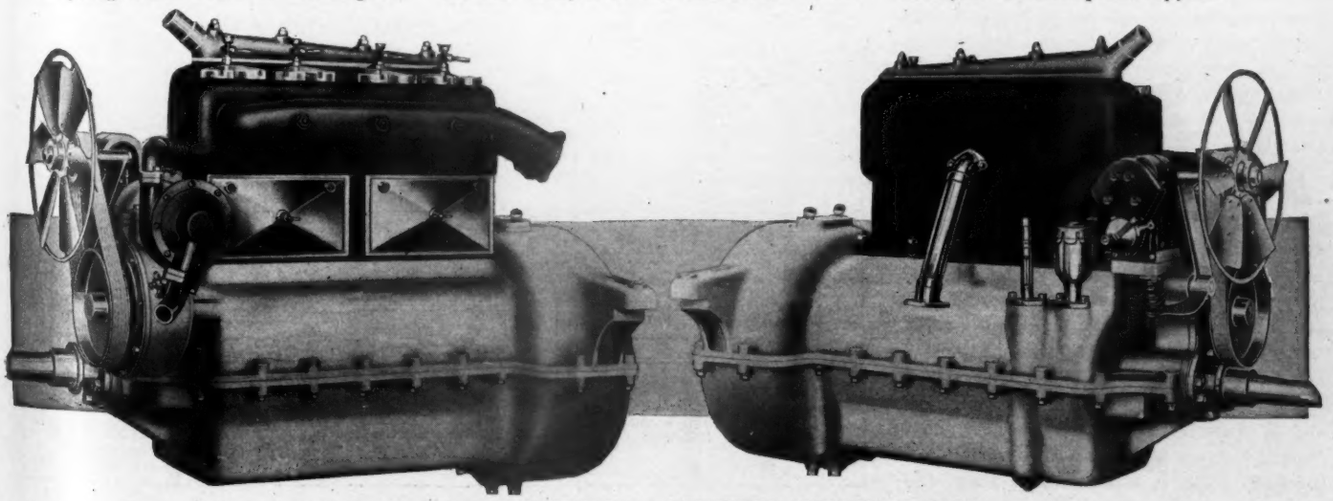
The valve mechanism is completely inclosed by three side-plates, secured by central studs and thumb nuts. The inlet manifold is on the right side of the motor, passages to the valves extending through each cylinder pair. The magneto and oil breather also are mounted on the right side, the latter being direct coupled to a cross-shaft at the front of the motor, which also drives the centrifugal water pump on the left side.

The fan is driven from a pulley at the end of the camshaft, and is mounted on a swivel bracket. This bracket is provided with a spring which bears on the magneto bracket, which serves to keep the belt taut. An extra gear is provided beneath the water pump to drive an electric generator if desired. The water from the pump is piped to each cylinder block separately, entering at the center of each block, directly beneath the exhaust manifold and between the inlet valves.

Lubrication is by splash, a positive plunger type of oil pump, driven by an eccentric from the camshaft, circulating the oil from the bottom of the oil reservoir to each of the connecting-rod splash pits and to the timing and other gears through large tubes. A constant level is provided in the splash pits by means of overflow holes, whence the oil is returned to the oil reservoir. There are but three timing gears, which are of wide face, large diameter and helically-cut.

The other model, a four, is of practically identical design except as to size and number of cylinder. In this motor the cylinders are cast in block, with the manifold integral. The cylinder sizes are the same as the six, 3¾ by 5¼. Like the six, the crankcase is divided horizontally, inclosing the flywheel. The valves are located on the left side, with the carbureter on the right. The magneto and pump are driven by the same cross shaft. The fan is mounted in the same manner, and the oiling system is identical. The chief differences are that the inlet manifold is a part of the cylinder block, the carbureter being connected by a single pipe to the center of the unit on the right side. The water piping is more direct, as the pump discharges direct into the end of the cylinder block.

Three bearings are used, provided with shims for taking up wear. These bearings are of exceptional size, being 2¼ inches in diameter, the front bearing 3⅛ inches in length, the center bearing 2⅛ inches long and the rear having a length of 4 5/16 inches, which makes a total bearing length of 9 5/16 inches. This model is furnished with three distinct types of crankcases—the unit type, described and illustrated, without provision for electric equipment; a second type, which has an additional gear similar to that on the six and provided with an Oldham coupling, which is adapted to drive any standard lighting and starting generator, and a third type without the flywheel enclosure. All types are arranged for three-point support.



LITTLE BROTHER OF MODEL 28, A RUTENBER MONOBLOCK FOUR

The Motor Car Repair Shop

Hints for the Amateur

Removing Wheel Bushings

THERE is a certain type of commercial vehicle in use whose wheel hubs are fitted with bushings as indicated at A in Fig. 1. These bushings are of bronze, and are pressed into the hubs from the inner side of the wheel. The outer end of each bushing bearing against a shoulder of the hub makes it difficult to remove the bushing, so that for some time it was customary to break up the bushing with a chisel and hammer whenever it was worn sufficiently to need replacement. This was a laborious operation, and often resulted in damaging the threads of the hub at either end.

To overcome these difficulties, the inner end of the bushing now is tapped out, or threaded internally for about an inch, then with the tap in place, or preferably replaced with a threaded iron plug, one has but to drive the bushing out with a drift and hammer as indicated at B. If the tap is used as a plug, the drift should consist of a bar of bronze or hard wood; otherwise the tap might be damaged. After having threaded and plugged the inner end of the bushing, a wheel-puller may be used to press the bushing out of the hub, or the wheel may be placed in an arbor press and the bushing thus easily pushed out of the hub. When a metal plug is screwed into the threaded end of the bushing, it should not be screwed in so far as to expand it against the hub of the wheel, as this will make it more difficult to remove. Care should be taken not to use a tapered tap. This little hint applies to the removal of all bushings that can be removed from one end only.

Getting a Roomier Tonneau Seat.

At a recent meeting of motor car salesmen assembled by the factory for the purpose of discussing advisable changes in the design and construction of the car for the next year's market, there was a strong demand on the part of many of the agents for a roomier body. It seems the factory had in the year past adopted a neat body design which had been attractive and sold well, but after the car had been in the possession of the purchasers for some months, there were complaints that the rear seat was hardly wide enough for three people to ride comfortably. To eliminate this trouble and to make the rear seat wider, several suggested that the body be brought out over the wheels, so that it formed a sort of mud guard and at the same time would tend to widen the rear seat considerably.

The idea was not new as it has been done and is to be seen on many old cars today. Now the object of the company in building the body as it is was twofold: First, the popular and neat flush-sided design was obtained; second, it reduced the room in the back seat so that it would not carry more than two adults comfortably, and thereby reduced the tendency to overload the vehicle.

Keep Gear Grease Clean

A little piece of metal such as a piece of a cotter pin or the like accidentally dropped into the can or pail of grease, and subsequently put into the gearcase of a motor car has been known to cause much damage, and give the driver or owner of the car considerable trouble and expense.

While visiting a racing camp a short time ago, the writer happened in while two or three of the mechanicians were cutting up and teasing one another. One who had been working on a greasy mechanism mischieviously flicked a chunk of grease into the face of another standing near the work bench. The bespattered one forcefully retaliated with a volley of cotter pins, nuts and washers which were snatched from a box on the bench. During the fusilade, the writer happened to notice that several of the small nuts, washers, etc., fell into a large can of hard grease which stood open in a corner of the room.

Upon calling attention to the fact, the seriousness of the situation quickly dawned upon the workmen, for the can had just been opened for the purpose of applying some of the grease to the gearbox of one of the racers. A fresh can then was opened for the purpose, while the nuts and things were carefully picked out of the previously opened can, and the can then set aside for the lubrication of grease cups.

One of the best make of motor cars was disabled and dropped out of an important reliability contest a short time ago because of a bent sliding gearshaft. After the car had abandoned the contest and was torn down for the extensive operations required to make the repair—fine, smooth chips of aluminum were found in the oil at the bottom of the case, which led the repairmen to believe that a chunk of aluminum from the inside of the case had been jammed between the gears and caused the slight distortion of the shaft, which was sticking.

Such carelessness is almost of as great seriousness in consequences as that of the workman who leaves some of his tools in the gearbox when filling it up with grease after making adjustments. A wrench in the gearbox of Tetzlaff's Fiat nearly kept it out of the Indianapolis race last Memorial day. The high-speed gears were stripped by the wrench during practice, but Tetzlaff was able to qualify on third and got new gears in in time for the race. The responsible mechanic was just as guilty of criminal carelessness as is the surgeon who sews up his forceps in a patient's wound.

White Lead for Connections

A leaky water connection can be very readily repaired in the majority of cases by simply loosening the connection, applying a generous coat to surfaces of the flanges, the gaskets or to the male portion of the joint, and then securing the connection again and leaving it stand for a few hours to give the white lead a chance to set.

A leaky water connection is a very annoying condition; it makes necessary the replenishing of the water supply of the radiator at frequent intervals if overheating is to be avoided; the rust markings of the leaking water gives the motor an untidy appearance, and if the required replenishing of the water supply is not carefully attended to considerable damage can be done the internal mechanisms of the motor as a result of the overheating.

The motorist or repairman who finds difficulty in fitting a new piece of hose to the male metal portion of a radiator or water manifold can greatly facilitate the operation by use of white lead as above mentioned. The white lead is oily and permits the rubber inner lining of the hose to slip onto the metal connection very easily, thus preventing it from being skinned or scraped from the fabric and clogging up the entrance to the metal connection. The oil in the white lead has a slight disintegrating effect upon the rubber, that keeps the rubber and the white lead in a comparatively soft condition. This insures a water-tight joint, keeps the rubber from cracking, and makes it easy to disconnect the rubber hose.

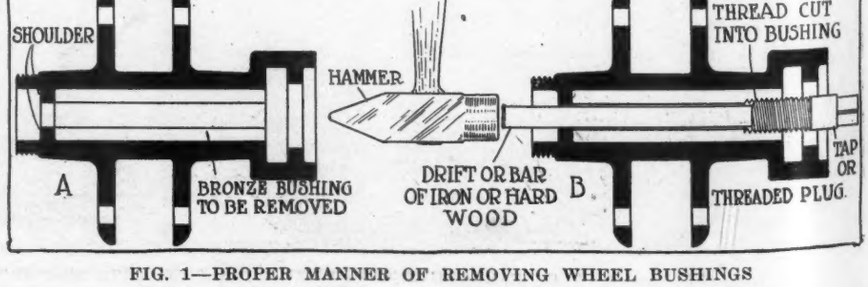
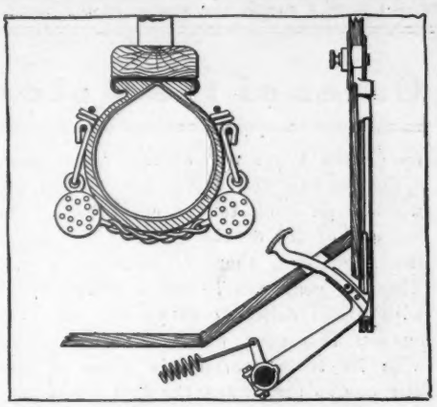


FIG. 1—PROPER MANNER OF REMOVING WHEEL BUSHINGS

Current Motor Car Patents

TWO-CYCLE Motor—No. 1,042,888—To Alphonse Butsch, St. Lucia, British West Indies. Filed October 29, 1910, dated October 29, 1912. Primary compression is effected in this motor in the crankcase, on the two-port plan. The intake is through a bi-pass in the crankcase, which communicates respectively, with the combustion chamber and the crankcase, through a vacuum chamber, disposed between the bi-pass and the crankcase intake. Ball valves are situated in the inlet passage and the intake from the carbureter. On the up stroke of the piston, a vacuum is produced in the crankcase which draws the gas through the intake passage. Upon the down stroke of the piston, the gas is compressed in the crankcase. Upon reaching the bottom of the stroke, the inlet port in the cylinder is uncovered, and the compressed gas enters the combustion chamber. Lubrication is accomplished by means of an oil cup connected by a tube to the cylinder just below the bottom of the piston stroke. A port in the piston is adapted to register with this opning whn the piston is at the top of its stroke, viz.—when the vacuum in the crankcase is the greatest. This permits the suction to draw the oil into the crankcase, where by a suitable tube, it is lead to the wrist pin, and by a drilled connecting-rod from thence to the crank-pin.

Anti-Skid Device—No. 1,042,722—To Turner W. Simmons, Bridgeport Conn., assignor of one-sixth to William C. Bowers, Bridgeport, Conn. Filed November 24, 1911, dated October 29, 1912. An anti-skidding chain, this device differs from those of similar nature in that the chain is used only as a supporting and actuating means, the skid-preventing element consisting of a series of ball connected in the cross chains at either side of the tire, so that in ordinary running, they are merely carried by the tire, and are under no pressure. Side friction, however, exerts a side-pull on the chains, drawing the outer ball toward the point of road contact of the tire, jamming it and preventing further skidding.



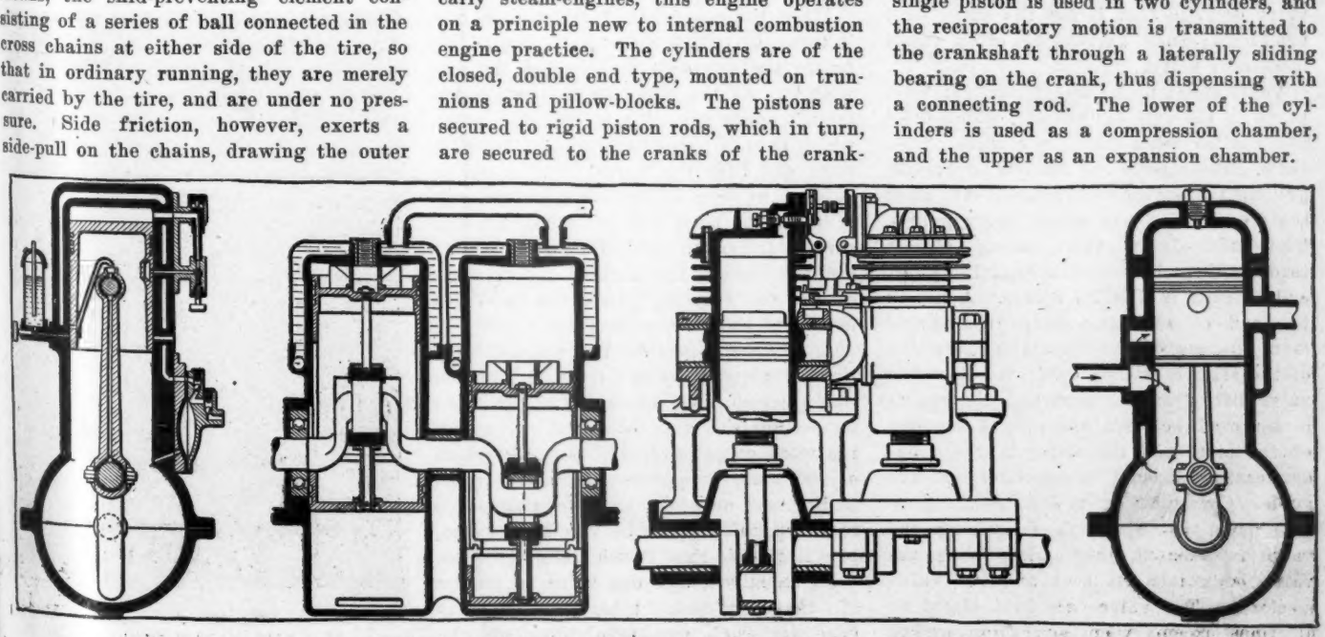
SIMMONS ANTI-SKID AND BREDE LOCK

Clutch Pedal Lock—No. 1,042,639—To Carl T. Brede, Detroit, Mich. Filed June 28, 1911, dated October 29, 1912. As a measure of prevention of unauthorized use of a motor vehicle, this device consists of a lock plunger, mounted on the dash, and extending downward to a position, adapted to engagement with a lug on the clutch-pedal arm, when the latter is in the extreme disengaged position. This lock plunger is inclosed in a stationary tube, and secured by a lock, so that it may be raised out of, or locked in engagement.

Reversible Gas-Engine—No. 1,042,540—To Orville H. Ensign, Los Angeles, Cal., assignor of one-half to Paul H. Blades, Los Angeles, Cal. Filed August 29, 1906, dated October 29, 1912. Reminiscent of early steam-engines, this engine operates on a principle new to internal combustion engine practice. The cylinders are of the closed, double end type, mounted on trunnions and pillow-blocks. The pistons are secured to rigid piston rods, which in turn, are secured to the cranks of the crankshaft, so that the cylinders oscillate in response to the rotary motion of the cranks. The lower cylinder chamber is used as a compression space, and the upper portion as an expansion chamber. The carbureter is connected to the cylinders through a tubular axle upon which the two cylinders rock upon the central pillow-block. This tubular axle communicates with the compression chamber upon the piston reaching the extreme upward portion of its stroke. The downward stroke of the piston compresses this gas, and upon the piston reaching the bottom of its stroke the compressed gases are allowed to pass through a passage to the combustion chamber, through a piston-opened port.

Three-Port, Two-Cyle Engine—No. 1,042,503—To Fredrick A. Thurston, Lynn, Massachusetts. Filed September 29, 1908, dated October 29, 1912. This patent is extremely broad in its claims, as it covers a two-cycle engine wherein the intake is through the side of the cylinder, uncovered by the piston, when the latter is at the top of its stroke, admitting gas into the crankcase, where it is compressed, and admitted to the cylinder through a transfer passage, and a cylinder port uncovered by the piston on the lowermost portion of its stroke. The exhaust is located opposite these ports, and is uncovered by the piston similarly to the manner in which the inlet is opened.

Another Twombly Motor—No. 1,042,505—To Willard Irving Twombly, New York, N. Y., assignor to Twombly Motors Co., New York, N. Y. Filed October 5, 1910, dated October 29, 1912. Of two-cycle design, this motor resembles the Holsman four-cylinder motor, in that a single piston is used in two cylinders, and the reciprocatory motion is transmitted to the crankshaft through a laterally sliding bearing on the crank, thus dispensing with a connecting rod. The lower of the cylinders is used as a compression chamber, and the upper as an expansion chamber.



BUTSCH, TWOMBLY, ENSIGN, AND THURSTON MOTORS

The Motorist's Kindergarden

EDITOR'S NOTE—Motor Age is publishing in this department a series of non-technical explanations of the various parts of motor cars for the benefit of the reader who knows nothing about them. The subjects will be dealt with in the most elementary manner, so that the series when completed will form a simple elucidation of the car. The first article appeared October 10, 1912.

Gates of the Motor

THE two openings in the cylinder through one of which the fresh mixture of gas and air is let into the cylinder and the other, through which the exhaust is let out of it, must be opened and closed at the proper times as explained last week. This is accomplished by means of gates in these openings or passages which are called valves. The passages are called ports. In the four-cycle motor, the type we are considering, each valve must open and close once for every two revolutions of the crankshaft. When we consider that this means each valve must open and close from 500 to 1,000 times every minute the motor is running and at just the right instant, it is easy to see that the arrangements for opening and closing them are of considerable importance. In fact most of the developments in motor design recently have been toward improving the form or method of operation of these valves.

In motor car use, the only common type of valve is what is called the poppet valve. It is simply a flat metal disk with a beveled edge which rests in a hole through which the gas is to pass. The hole has its top edge beveled the same as the valve so that when the latter is resting on the edges of the hole it makes a tight fit and no gas can pass in or out of the cylinder. The beveled edge of the hole is called the valve seat. The upper side of the disk is flat but from the center of the under side there projects a metal rod called the valve stem. This usually is welded to the valve disk, so that it has the shape of a mushroom; such valves are often called mushroom valves.

Valve stems pass through vertical holes bored in the cylinder casting, which holes are central with the larger holes above them. These holes are for the purpose of guiding the valves so they drop into their seats easily and are called valve guides. The ends of the valve stems project through these holes and around the lower end of each is a coiled spring. A pin in the end of the stem keeps the spring from slipping off, so when the lower end of the stem is pushed up from below, the valve lifts from its seat and the spring is squeezed between the pin in the end of the stem and the metal in the cylinder casting around the bottom of the guide. Consequently, as soon as the pressure from below, which is raising the valve is released, the spring pops the valve back into its seat and the valve is closed. The valves are held closed at all times except when something pushes up on the lower end of the valve stem.

To see how the valves are pushed up, we will go back to the crankshaft. On one end of the crankshaft, Fig. 5, usually the front end, there is fastened a cog wheel or gear wheel—just a metal wheel with knobs called teeth on its rim. Up against this gear wheel, is another one with its teeth meshing in those of the first one so that when the first one turns, the other turns too. This latter gear is called the camshaft gear and is attached to a shaft which runs back along the side of the cylinder. On this shaft, called the camshaft, there are placed little irregular wheels called cams. Cams aptly have been described as wheels with humps on them. The rim instead of being a circle like the rim of a wheel so that the rim is the same distance from the center all the way round, has a bump in it where the rim is farther away from the center than at other points.

The cam is located right under the lower end of the valve stem, but between the end of the stem and the cam is placed a short rod called the push rod. This is arranged to slide up and down in a guide attached to the cylinder casting or the base of the engine, the guide being called the push-rod guide. The lower end of the push rod rests on the rim or face of the cam and the upper end is against the lower end of the valve stem.

When the crankshaft turns, the gear on it turns, driving the camshaft gear. This makes the camshaft revolve and the cam with it. As the bump on the cam comes around under push rod, it lifts the latter, which in turn presses upward on the valve stem and lifts the valve. The latter is held up as long as the bump on the cam is under the push rod, but when the cam turns further so that the bump comes out from under the pushrod the pressure of the valve spring forces the push rod down and the valve closes.

It will be seen that the valve is continually popping up and down as the cam turns, which may account for the name poppet for this type of valve. However, the word poppet probably is a corruption of the name puppet applied to this type in England, on account of its resemblance to the popping up and down of the puppets in the old-time Punch and Judy show.

As explained, any one valve in motors of the four-cycle type operate only once for each two revolutions of the crankshaft; also by the arrangement of the cam the valve operates once for every revolution of the camshaft. Consequently, the camshaft has to revolve only half as fast as the crankshaft. This is accomplished by making the camshaft gear twice as large as the gear on the crankshaft. When two gears, two sprockets or two pulleys are driven, one by the other, their relative speeds are inversely proportional to their diameters. That means that if a gear wheel 6 inches in diameter turning at 1,000 revolutions per minute drives a 12-inch gear wheel, the larger one will turn at half the speed of the smaller one, that is, 500 revolutions per minute. These gears are called the valve timing gears or timing gears. The most usual form of the timing gears are the ordinary spur gears with straight teeth on their circumference, although the practice is becoming common, for the sake of silence, to use gears with the teeth cut on a slant, called helical or spiral gears. Another arrangement which is gaining in favor is to use gears or sprockets connected by a chain instead of having them in mesh.

In Fig. 5 and 6 are shown sections of two motors having two different arrangements of the valve operating mechanism. It will be seen that in Fig. 6 the exhaust valves are on one side of the cylinder and the inlet valves on the other, while in Fig. 5 both inlet and exhaust valves are on the same side of the cylinder. The one with the valves on both sides

FIG. 5—VALVES OF AN L-HEAD MOTOR AND THE VALVE MECHANISM

has an extension either side of the top of the head for the valves so that it has somewhat the shape of the letter T. Quite reasonably, this shape of cylinder is called a T-head cylinder and motors with valves on opposite sides as this has are called T-head motors. Likewise, the other cylinder with both of its valves on the same sides is called an L-head cylinder because there is an ell extending from one side of the cylinder. Motors with cylinders of this shape are called L-head motors.

There are other locations of valves and consequently other shapes of cylinders, which will be illustrated next week; but these two are by far the most common and are illustrated here to show how the valves are operated in the ordinary motor. It will be seen that with the valves both on the same side of the cylinder as in the L-head motor illustrated, both the inlet and exhaust valve can be worked from the same camshaft, by simply putting two cams on the shaft, one under each valve.

In the T-head cylinder with the inlet valve on one side and the exhaust valve on the other, the same shaft cannot be used to work both valves; so two camshafts are employed, as shown at the left in Fig. 6. It is only necessary to put another camshaft and gear on the other side of the cylinder and have the gear on the crankshaft drive the two camshaft gears instead of one as is done with the L-head cylinder.

In Fig. 7 is shown an enlarged view of the valve and push rod in skeleton. It will be noticed that in Figs. 5 and 6 the end of the push rod instead of being flat has a roller on it. This is better construction than allowing the push rod end to slide directly on the cam because it reduces wear which would reduce the lift of the valve.

FIG. 6—VALVES AND HOW THEY ARE WORKED IN T-HEAD MOTOR.

The Motorists' Bookman

Treatment of Steel

TO supply a demand among practical men for a book treating the working of tool steel, in a simple, direct and complete manner, Joseph V. Woodworth has prepared a treatise on "Hardening, Tempering, Annealing and Forging of Steel" that possess a great deal of merit. The demand arises, to some extent, from the fact that there is little data to be had in print on this subject. The information is derived from the personal experience and research of the author, and the exhaustive study of a host of miscellaneous articles on the subject.

In recognition of the fact that the most important contributory influence towards the production of high-quality tools is the quality of material used, the subject of steels, their qualities, peculiarities, properties and uses is exhaustively treated. The distinction between the principal brands of tool steel is established, and the important differences in their manipulation explained. The steel industry in general is treated. Methods and equipment for the proper annealing and cooling of annealed steel is covered in a very complete manner. The annealing, hardening and tempering of steels in general being covered, a few chapters are devoted to special jobs, such as casehardening, the hardening of milling cutters, the hardening, tempering and straightening of small tools and gauges, and the hardening and tempering of punches, dies and templets. Following this the subject of welding is taken up. Hand and drop forging is next explained, followed by a very valuable collection of miscellaneous methods, processes, kinks, points and tables, for use in metal working. Added to this is a chapter on grinding that is very complete. The volume is triple indexed, and especially valuable as a reference work and guide to practical work of this description. It is bound in maroon cloth, 6 by 9½ inches, and sells for $2.50 net. N. W. Henley Co., New York, is the publisher.

Practical Aeronautics

Those students of aeronautics who would study the subject in a thorough and earnest manner will find few better texts in print than that which has been prepared by Charles B. Hayward, and his collaborators, and published by the American School of Correspondence, Chicago. "Practical Aeronautics" is a work of completeness covering the history, theory, practice and development of both forms of aerial navigation; that of lighter-than-air and heavier-than-air machines. The matter is simple, direct and understandable. Obscure mathematics are not indulged in as a means of evading difficult explanations, but such explanations are made with the utmost pains, and in a direct and logical style that fixes the idea firmly in the mind of the reader at the first reading, in most cases. Mathematics is not omitted, however, but is given as a means of graphically demonstrating the points covered and assisting the reader in making original computations and calculations to further fix the principles discussed in his mind. The work contains 752 pages, replete with illustrations, tables and diagrams, and is bound in cloth, 7 by 9¾ inches.

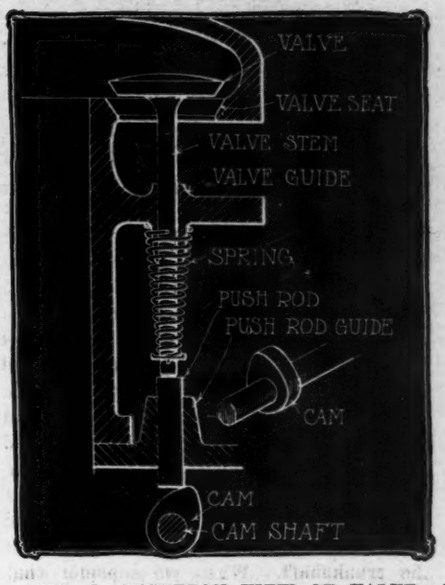


FIG. 7—SKELETON VIEW OF VALVE MECHANISM

The Michelin Guide

The 1912 edition of the "Michelin Guide to the British Isles," which is volume 11 of the Michelin series, follows the same style of makeup as in previous years, and as in the past the book is replete with information most valuable to a motorist, in addition the many routes and map which comprise the 684 pages. These guide books are distributed gratis by the Michelin Co., London, Eng.

Splendors of Oregon

Too much cannot be written of the splendors of the mountain regions of the west when told with simple candor. "The Guardians of The Columbia," by John H. Williams, which deals with a section new in descriptive literature, is written in the same spirit and published in the same style as "The Mountain That Was God," and tells of the three great, white mountains—Mount Adams, Mount Hood and Mount St. Helens, sentinels of a mighty river and watchers over the magnificent country tributary to it. Scenic description, history and myth of the river, the mountains and the forests make up the text, which is profusely and beautifully illustrated. Three editions are procurable, edition de luxe, $2.50; library edition, $1.50; and news-stand edition, 75 cents. This work is published by J. H. Williams, Tacoma, Wash.

From the

PENN'S Big Registration—The number of cars registered in Pennsylvania for 1912 is 58,540, the greatest ever known in the state.

To Finish Road Repairing—Officers of the Pennsylvania Motor Federation, who have been looking up state repair work on the main highway system, have been assured that the rehabilitation of the remaining 2,000 miles will be undertaken as soon as spring permits resumption of operations.

Studebaker Day Celebrated—The recent Studebaker day at the Georgia state fair brought out a party of nearly 5,000—owners of Studebaker cars and their families—gathered as guests of the Studebaker Corporation at a big, old-fashioned southern barbecue. All carried Studebaker banners and many gloried in special decoration. A feature was a Studebaker electric which had been driven daily on Macon streets for 10 years, and was the first motor car ever owned there.

Philadelphia Club to Move—Ceremonies appropriate to the occasion will mark the opening of the members' club rooms in the Automobile Club of Philadelphia's new building, Twenty-first and Market streets, the latter part of November, no definite date having been set for the occasion, owing to uncertainty as to when the builders will finish their work. The first floor garage service of the organization, however, is in running order and the second and third floors well under way. Each floor has space and facilities for handling 100 cars.

New Wisconsin Ruling—In fining the chauffeur of Mrs. L. Kissel, widow of the founder of the Kissel Motor Car Co., of Hartford, Wis., for violation of the speed laws, Judge Armin, of the municipal court at Waukesha, Wis., stated: "Bruce Ismay, owner of the Titanic, was held responsible for the terrible loss of life in the accident due to speeding on the ocean. Hereafter the same principle will apply to owners of motor cars which exceed the speed limit. The owner of the car will be held just as liable as the driver. Captain Smith, of the Titanic, was not held entirely to blame for the sea disaster. Neither should the chauffeur bear the entire burden."

Ohio Road Work—Figures compiled by State Highway Commissioner James Marker show that Ohio has so far this year contracted for the construction of more than 150 miles of road. Between now and January 1 contracts will be let for the construction of about 25 more miles. The state roads this year are being constructed chiefly of water-bound macadam, concrete or brick. The old style gravel road which is still popular with the rural county commissioners who have neglected the science of road building received scant attention from the state department. Less than 5 miles of it were let by the state this year. Over 62 miles of water-bound macadam roads were contracted for and about 41 miles of concrete. More than 35 miles of brick road were built. About 10 miles of bituminous macadam were laid.

Gophers to Move Quarters—The Automobile Club of Minneapolis and the Minnesota State Automobile Association will move their joint office from the Hotel Radisson, where it has been established 2 years, to make room for a cafe.

Boom in Sheboygan—A new stunt to enliven interest in the motor club was successfully tried last week by the Sheboygan Automobile Club. Every owner in Sheboygan county, Wisconsin, was invited by letter to participate in a big stag, and about 75 per cent of them showed up. Nearly 100 new members were gained in this manner and the club jumped into fame in a few short hours as being a real, live organization. Sheboygan has a population of 25,000 and claims a larger percentage of owners than any city of its size in the country.

Using Card Instead of Bond—An agreement has been reached between the Hoosier Motor Club and the authorities of Indianapolis, including the board of public safety, Martin J. Hyland, superintendent of police, and Judge James A. Collins, of the city police court, whereby when members of the club are arrested for violating the speed laws or traffic ordinance they need not go to police headquarters. Cards will be issued to its members by the club. When one of the members is arrested he will turn his card over to the officer making the arrest and be allowed to go without giving bond, to appear in police court the following morning. The club has agreed to stand responsible in all such cases for the appearance of the defendant.

Lack of Rain Helps Louisiana—Rainfall in Louisiana during the past 12 months has been unsually light. Coming just at this time when the good roads work is so active it has been most fortunate for the motor car industry. Road building has gone forward with much greater rapidity than ever before and dirt roads previously impassable to cars have been used regularly, thereby creating a demand for roads that will be passable even in wet seasons.

Club at San Jose—San Jose, Cal., has established something like a record in the quick establishment of a motor club. At the beginning of the present month a number of enthusiasts decided that the Garden City ought to have a motor organization and a club house. Promptly they got together and organized a country club. Within the next 2 weeks they secured a membership of 275, raised $45,000 in actual cash, bought 90 acres of foothill land near Alum Rock park, and let a contract for the erection of a handsome club house and the laying out of extensive golf links. There will also be a large and elaborate garage. The membership of the new club is limited to 300. The charter members include some of the most prominent men of Santa Clara county. The officers are as follows: President, W. S. Clayton; secretary, John R.

Old Roads Made New

LAST week Motor Age presented illustrations made from government photographs showing a New Hampshire transformation scene. Herewith is a Tennessee example. The scene is near Nashville and shows what can be done with roads.

Four Winds

Chace; treasurer, Albert Bettins. It is expected that New Years will be celebrated within the walls of the new club house of the Californians.

Indianapolis Show Dates—The annual motor car show of the Indianapolis Automobile Trade Association will be held March 24-29 and probably will be held at the Coliseum at the state fair grounds, north of Indianapolis. At an election held last week the club elected the following directors: For 3 years, George A. Weidley, Fred I. Willis and Frank L. Moore; for 2 years, Ellis Hunter, H. H. Rice and Harry L. Archey; for 1 year, R. P. Henderson, B. M. Wylie and L. L. Banford. Officers have been elected by the directors as follows: President, Mr. Moore; vice-president, Mr. Rice; secretary, Mr. Hunter, and treasurer, Mr. Willis.

Rules of Road Puzzling—Now that the dreams of the Canadian Highway Association for a motor highway across Canada are coming nearer and nearer realization, the question of the rules of the road is being brought up with great frequency. At both ends of the proposed highway the rule of the road is to drive to the left, but over by far the greater part of the route the rule is to drive to the right. This matter is one of special interest to the motorists of British Columbia, for that province is one of the very few places on the continent where the rule of the road is to drive to the left. As may be expected, opinion is divided as to whether or not this system is better than driving to the right, but in spite of these differences of opinion, the motorists of Vancouver are almost unanimous in declaring that there should be a universal rule of the road, so that all confusion for travelers might be eliminated.

Owner Is Responsible—A car owner who requires an employe to ride with him must be responsible for injuries that may result from such a ride, according to the supreme court of Minnesota. A. H. Patterson, chauffeur, received a $4,500 verdict in the lower court. The award is sustained. While driving fast with the owner in the car the machine turned turtle and injuries resulted to the chauffeur.

New Orleans After a Parkway—By purchasing a very few blocks of residential property in New Orleans it will be possible to have a parkway extending diagonally across the city from the Mississippi river at Audubon park to Lake Pontchartrain, a distance of 17 miles. The motor speedways in the various parks that thus will be connected will be welded into one and is to be made one of the finest in the south.

Interested in Glidden Trip—It is declared in New Orleans that the tour of the Glidden party has been the cause of greatly increasing the interest in motoring in that city. Business stopped completely during the 30 minutes the tourists paraded the principal streets on the arrival of the tour. A great amount of space has been given the industry by the local papers in connection with the arrival of the Glidden party, and the entertainment that was accorded them. Statements by some northern manufacturers to the effect that no one was willing to undergo the hardships of a drag through the wretched roads of the south, in explaining why the A. A. A. tour failed, caused general resentment and the success of the Glidden expedition is hailed as a forcible refutation of such statements.

Mankato Club Active—The Automobile Club of Mankato, Minn., has closed the season with a tour of fifteen cars and fifty-five tourists through St. Peter, New Ulm, Madelia, Hanska and Lake Crystal, a 1-day run. The club has had several neighborhood runs through the summer.

Illinois' Tag Report—During the third quarter ending October 1, Secretary of State Doyle has collected $38,098 for motor car registration in Illinois, making the total cash on hand in that department $439,260. This money has been set apart as a road fund to be appropriated by the general assembly for use on country highways. There will be strong influence exerted to have this money utilized for a main road between Chicago and St. Louis.

Vigilance Committee Formed—To prevent speeding within the city limits of Birmingham, Ala., a vigilance committee has been formed by citizens. The majority of the committee is composed of owners of motor cars. This action has been taken after the appeals to the police department have not caused such action as promises to be effective. Members of the committee will so arrange their hours that several watchers will be on duty night and day.

Heavy Registration in Wisconsin—All known records for number of motor cars owned and operated in Wisconsin have been shattered this year, the secretary of state of Wisconsin reporting on November 1 that 24,468 licenses had been issued to date for motor cars, with prospects of increasing this number to a round 25,000 by December 31, because applications have been coming in at the rate of 10 to 15 per day for the last month. The total revenue of the licensing system from January 1 to November 1 was $135,690. Wisconsin license plates for 1913 will consist of a deep blue field, with numerals in natural aluminum color. The 1912 plates were on a red field with aluminum numerals.

Boosting Concrete Roads—To take advantage of every opportunity at hand to promote the good roads movement, the Kenosha Automobile Club of Kenosha, Wis., on last Sunday arranged a junket to Milwaukee for members of the club and of the county board of supervisors, as well as city officials, to inspect the 12 miles of concrete road built in Milwaukee county this year. One object of the trip was to determine upon some continuous highway system between Milwaukee and Kenosha and arrange to build roads uniformly as regards width and material. The Kenosha club is pushing concrete as the only road material that will suffice for the sandy soil along the shore of Lake Michigan, and the Milwaukee view made a favorable impression upon the county board.

Part 2—Tennessee

Before the road-makers got busy this stretch of highway, which is near a public school, was in deplorable condition. Now it is a finely macadamized strip of road that speaks well for the progressiveness of the community.

Among the Makers and Dealers

MAKING Steel-Hoof Tractor—The Buckeye Mfg. Co. has nothing to do with the production of the Lambert Steel-Hoof tractor, which is turned out by the Lambert Gas and Gasoline Co., of Anderson, Ind.

Elmer Resigns—H. H. Elmer announces he has severed all connections with both the Grant Motor Car Co. and the Grant-Lees Machine Co., of Cleveland, retaining only the drawings, specifications and tracings of the Grant six.

St. John, N. B., Lists Show—St. John, N. B., is to have its first show and the date has been placed from January 25 to February 1. Arrangements have been completed for the drill hall at the southern end of Carmarthen street. This hall has a very large floor space.

Exporting to South America—Two cars consigned to the municipal authorities of San Jose, Costa Rica, were exported last week through the port of New Orleans. There is an increasing amount of motor car tonnage being shipped through New Orleans to Central and South American ports.

Claims Infringement—The Victor Inner Tire and Rubber Co., Dayton, O., is the defendant in a recently filed suit in the United States district court brought by Cecil Adamson, of East Palestine, O., who alleges that the concern has infringed on a patent on improvement in tire vulcanizing repair apparatus. He asks $5,000 damages, an accounting and an injunction restraining the defendants from further infringement on his patents. J. Everett Inman and George Inman are named in the suit.

New Pathfinder Factory—Work on the new factory addition of the Motor Car Mfg. Co. of Indianapolis, which is being erected near the Nordyke & Marmon plant, is being rushed night and day, and it is hoped that it will soon be ready for occupation. The new buildings are of two stories, built of brick, with cement-paved floors. The present plant adjoins the new buildings, and communication will be established between the two structures. The plant will be equipped with the bilateral lighting system, and elevators between floors. The construction is of reenforced concrete and steel, and modern throughout. December 1 is the day set for completion, at which time the plant will be immediately occupied and work commenced upon the new models of the Pathfinder car.

MAGNET BILL works for the Willys-Overland company at Toledo. He gets his nickname from the fact that his tools consist solely of one tin bucket of the 10- or 12-quart variety and a big steel magnet, strapped to the end of a shovel handle to allow for ease in operation. It is Bill's duty to save tires by removing from the roadway every nail and bit of iron, brass or steel that might cause a puncture. When it is known that the 40,000 cars which is the Overland output for 1913 are being run back and forth in reaching the place where they are tested, and scores of visitors' cars, office machines and delivery trucks use the thoroughfare daily, the wisdom of saving tires is at once apparent. Vice-president G. W. Bennett figures Bill saves the company $20,000 a year.

THIS MAN SAVES OVERLAND $20,000 A YEAR

Will Sell De Tamble Plant—E. N. Hill, Thomas De La Hunt and Frank F. Taylor have been appointed by H. C. Sheridan, referee in bankruptcy, to take an appraisement and inventory of the property of the De Tamble Motors Co. at Anderson, Ind. When the appraisement and inventory is completed, the property will be offered for sale. J. C. Teegarden was recently appointed trustee to represent about $75,000 worth of unsecured claims against the company.

Car Display in Minnneapolis—In Made-in-Minneapolis week, which closed Saturday, motor cars and traction machines formed an attractive part of the out-door exhibits. The H. E. Wilcox Motor Car Co. displayed two trucks—one chassis and the other with portable house attached to the frame. The Nott Fire Engine Co., a new model of combined motor and fire engine pumping machine, and the Robinson Motor Truck Co., a Minneapolis chassis. Traction engines made locally were on exhibition for the Emerson-Brantingham Minneapolis branch, the Minneapolis Steel and Machinery Co., the Diamond Iron Works, the Imperial Machinery Co., and the Kinnard-Haines Co.

To Make Carbureters—The Sprung Carbureter and Clutch Co., Detroit, has been incorporated to manufacture the patented devices of Edmund Sprung, which consist of a carbureter and a clutch. The former is a three-jet type, the throttle lever connecting with a sleeve which goes over the jets and which uncovers more of them as the throttle is opened. The incorporators are Edmund Sprung, William Healy and J. S. Kennary.

Special Train for Hoosiers—Members of the Indiana Automobile Manufacturers' Association will send their exhibits to the New York show in January by special train. This was decided upon at a meeting of the association held in Indianapolis on the evening of October 31. A New York show committee to arrange the plans for the train and for exhibiting at the show was appointed, as follows: J. Guy Monahan, of the Premier Motor Mfg. Co.; Har-

WHERE THE PATHFINDER IS MADE AT INDIANAPOLIS, SHOWING A RECENT ADDITION

old Hyde, of the Empire Motor Car Co.; William Esterley, Firestone Tire Co. Another meeting of the association will be held in Indianapolis on the evening of November 21 to discuss the proposed run to be made to the Pacific coast next summer.

A. G. Schonacker Resigns—A. G. Shonacker, general manager of the Marvel Carbureter Co., has resigned his position on account of his condition of health, and expects to locate in the west. The Marvel company has moved its entire plant to Flint, Mich.

Good Business in South—Sales in New Orleans during October have exceeded any single month in the history of the industry in that city and tributary territory. A large cotton crop is the basis of the general prosperity which the south is enjoying. The growth of the trucking business within a radius of 100 miles of the city is proving a great source of wealth and is having a direct influence on the motor car industry, as many of the owners of truck farms live in the city and have to make frequent trips to and from the properties.

New Penn Receiver Named—By agreement among the parties, the receivership of the Penn Motor Car Co. has taken a new turn, the Commercial Title and Trust Co. of Pittsburgh having succeeded E. E. Gregg as receiver by appointment of the courts of Allegheny county. In accordance with an agreement between creditors and stockholders of the corporation, a bill in equity has been filed in the common pleas court of Allegheny county at Pittsburgh asking the appointment of a receiver, an understanding having been reached that the bill in equity in the Lawrence county courts, upon which Mr. Gregg was appointed, be withdrawn.

Kline's New Richmond Plant—Twenty employes of the Kline Motor Car Corporation, of York, Pa., including a number of mechanics and other workmen, have gone to Richmond, Va., in order to install the machinery and complete the other preliminaries for the opening of the company's new plant in that city. All the men at the York factory have been offered positions in Richmond and quite a few will leave York within the next week or so. The Kline corporation has erected a large modern plant in Richmond at a cost of more than $100,000 for the manufacture of the Klinekars. For some weeks past machinery and other factory equipment have been shipped from York. Within the near future General Manager James A. Kline and other heads of the firm, as well as quite a number of the employes, will go to Richmond to reside permanently. The Kline corporation will not abandon the plant in this city, but will be in a better shape than ever before to cater to the wants of the owners and agents in this territory. The Richmond factory is built in two parallel wings, connected at one end by a shorter wing, in front of which and connected with it is a two and one-half story office building. The material is brick and the trimmings are of white stone. The structure stands on a concrete foundation and the floors of the factory are cement. Each of the main wings is 600 feet long and 60 feet in width. They are one and one-half stories in height.

After Findlay Plant—A group of Toledo and Lima capitalists have formed a syndicate with a view to purchasing the property of the Findlay Motor Co., at Findlay, O. If the deal is consummated the plant will be operated at Findlay.

Harris on Hupmobile Staff—Fred A Harris has been appointed assistant general manager of the Hupp Motor Car Co., Detroit. Harry Fosdick, who has been acting temporarily as assistant general manager, will assume the title of director of sales.

Ajax-Grieb Expanding—Largely increased business has caused the building by the Ajax-Grieb Rubber Co. of a considerable addition to its plant at Trenton, N. J. The three-story building which will add 36,000 square feet to the manufacturing capacity of the makers of Ajax tires is now in course of construction. The dimensions of the new brick building are 200 feet by 60 feet. The Ajax business in the past year is said to have increased 15 per cent over the previous year. The factory has worked 24 hours a day since February, 1911, and is still doing so.

More Freight Cars Ordered—A car order recently placed by the Pennsylvania railroad will be of interest to car dealers and owners. The order was for 4,500 cars. Of this order 1,000 of the cars are to be for the hauling of motor cars. This is supposed to be the result of the car manufacturers' complaints of a great shortage of cars fit to haul their product and a threat on the part of some of them to drive the machines to their destinations rather than to wait for weeks in order to get cars in which to ship them.

Clearing House a Success—When the motor car clearing house was first formed in Seattle it was with the idea of keeping it going not more than a month, but owing to the success of the venture it has been made a permanent institution. The mammoth garage at Union and Broadway will stable more than 100 cars and can at all times of the year accommodate all of the good bargains in second-hand cars. Not only is it of benefit to the dealers and their used cars, but private owners are at liberty to list their cars free of charge and for a small commission can readily dispose of them. To the country buyer it is of even greater value and convenience than to the city man, as it groups all cars under one roof.

Pittsburgh After One Show—Negotiations are still pending between the two Pittsburgh organizations which hold annual shows with a view of consolidating this year into one huge exposition. These negotiations have been on and off for several months.

Will Build Permanent Plant—That the Lavigne Gear Co., formerly of Corliss, Wis., and now located at Racine, is occupying part of the old Racine-Sattley Co.'s plant only temporarily, and the recent move was in line with its plans to establish a permanent home of its own in Racine, has just developed. The company is controlled by the Uihleins of Milwaukee, who own the Schlitz Brewing Co., of Milwaukee, and have a heavy financial interest in one or two of the largest motor car and parts manufacturing companies in the west. The Lavigne company during last week took occupancy of factory No. 17 of the Racine-Sattley works, affording 48,000 square feet of space. Two hundred men are now employed, and the output is being considerably enlarged. As soon as the officers have selected a site for permanent location ground will be broken for a large and modern fireproof factory. In the meantime, the quarters in the Racine-Sattley works will be enlarged as found necessary.

NEW PLANT OF KLINE MOTOR CAR CORPORATION AT RICHMOND, VA.

Buys U. S. Motor's 'Frisco Branch—Frederick J. Linz, manager of the United Motor San Francisco Co., which for some time past has been owned entirely by the United States Motor Co. and has been the Pacific coast distributing depot for the Maxwell and Columbia lines, has bought out all the interests of the big combine for northern California and Nevada, and will hereafter handle the Maxwell and Columbia as an independent dealer. It is reported that the price paid the factory for stock on hand, parts and good will was $25,000. Associated with Linz in the deal is L. W. Sanborn, treasurer of the United Motor San Francisco Co.

Development Briefs in Accessory Field

Patterson Battery Sets

ONE of the greatest drawbacks to the use of dry-cell batteries for motor car ignition is the difficulty experienced in keeping the connections tight, and their inconvenience in handling. It is also a well accepted fact that the severe vibration causes them to deteriorate more rapidly than normal, owing to the usual method of carrying them loose in a box. With a view to removing these drawbacks, and increasing the life of the battery, Stanley & Patterson, New York, has produced a screw-socket connection plate that is sold in strips, units and sets. Of especial interest to motorists is the line of steel motor car sets. The feature of these connection sets is a screw socket, adapted to receive screw-top dry cells, in which the contacts are made automatically upon the insertion of the cell. This is effected by constructing the positive contact spring so that when the cell is removed, it makes a contact with a bar, connected to the negative contact, which comprises the threaded portion of the socket. The insertion of a cell breaks this contact by depressing the positive contact spring, leading the circuit through the cell. The sockets are permanently wired in a variety of systems, such as series, series multiple, and straight multiple. An improvement over past models of this device consists of a new contact arrangement, whereby in a simple series circuit, the removal of any cell does not disturb the connections of the others. This is shown in Fig. 1, together with one of the steel motor car sets, and the type of battery employed. It is claimed that when properly screwed in, the cells are immune to vibration, and cannot become bruised.

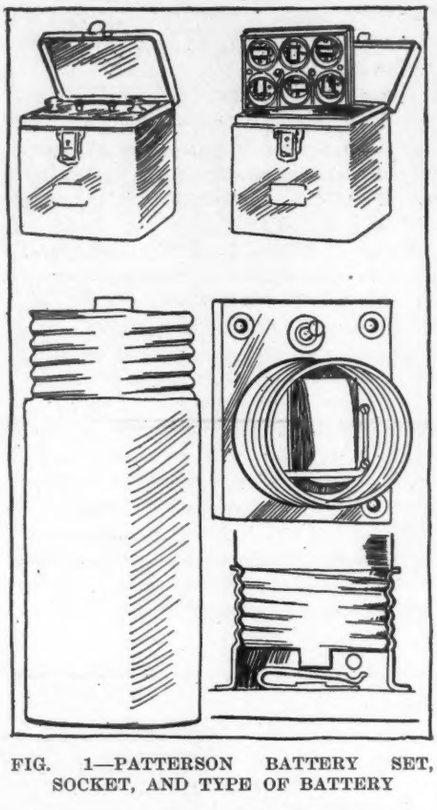


FIG. 1—PATTERSON BATTERY SET, SOCKET, AND TYPE OF BATTERY

The J-M Demountable Rim

Combining the features of a rim demountable from the wheel and embodying an original quick-detachable feature, by which the tire may be easily and rapidly removed from the rim, the J-M demountable Q. D. rim, a product of the H. W. Johns-Manville Co., New York, has been designed with a view to extreme simplicity, adapting it especially to the private owner. It consists of but two principle parts, in three pieces, viz.: the felloe band, which is permanently secured to the wheel, and the rim base, which is made in two pieces.

These two pieces as shown in Fig. 5 are secured one to the other by means of dowel pins. To separate them, permitting the removal of the tire, a screw-driver is inserted beneath the inner member, and it is pried off. In re-assembling it with the new or repaired tire, the tire is first forced on to the outer portion, and the inner portion with its holes placed opposite the dowels in the outer portion. Treading on it then springs it into place. The rim base is secured to the felloe band by means of five locking clamps held by bolts. These clamps are dropped for demounting by unscrewing the bolts at the top of the wheel, in turn, allowing the clamp to drop down to clear the rim base by gravity and tightening the screws again to lock them so. Upon re-applying the rim, the bolts are loosened in turn at the lower portion of the wheel, and the clamps allowed to drop into place, when the bolts are tightened again. No tools are required but a wrench and a screw-driver, or a single combination tool, furnished by the manufacturers. The demounting features are illustrated in operation in Fig. 2.

Air-Friction Carbureter

Air-friction, or the vaporization of gasoline in the fluid state by contact with moving air, constitutes the feature of the carbureter shown in Fig. 3. The nozzle has been eliminated in this carbureter. The principle advantages claimed for this device are that the method of vaporization is more thorough than the spray or atomization method, as in the later process, the fluid is projected in a stream of minute globules, which are mixed with the air, but do not combine with it to form a true, homogeneous gas; but that by air friction, the gasoline is not mechanically broken into small bodies, but is mixed with the air by natural evaporation, in the same manner as it would mix with the surrounding air if placed in a shallow pan, in a closed space.

Referring to the sectional view, it will be seen that with the exception of the somewhat simplified lines, the mixing feature, and the air valve, this carbureter differs only slightly from the usual type. Gasoline is fed on the float-feed principle, to the feed tube F. The level of the fluid in the float chamber is slightly below the outlet of this tube. It opens between the two disks, D and B, the fluid being drawn into the flat space between them by capillary attraction, and spreads out in the form of a thin sheet, the outer edges of which are exposed to the blast of indrawn air from the air intake, A, to the mixing chamber M.

It is a physical property of all volatile liquids that their evaporation is accelerated or retarded according to the amount of air with which they come in contact. The gasoline at the edges of the disks, mixes with the air as it passes, evaporating very rapidly when the speed

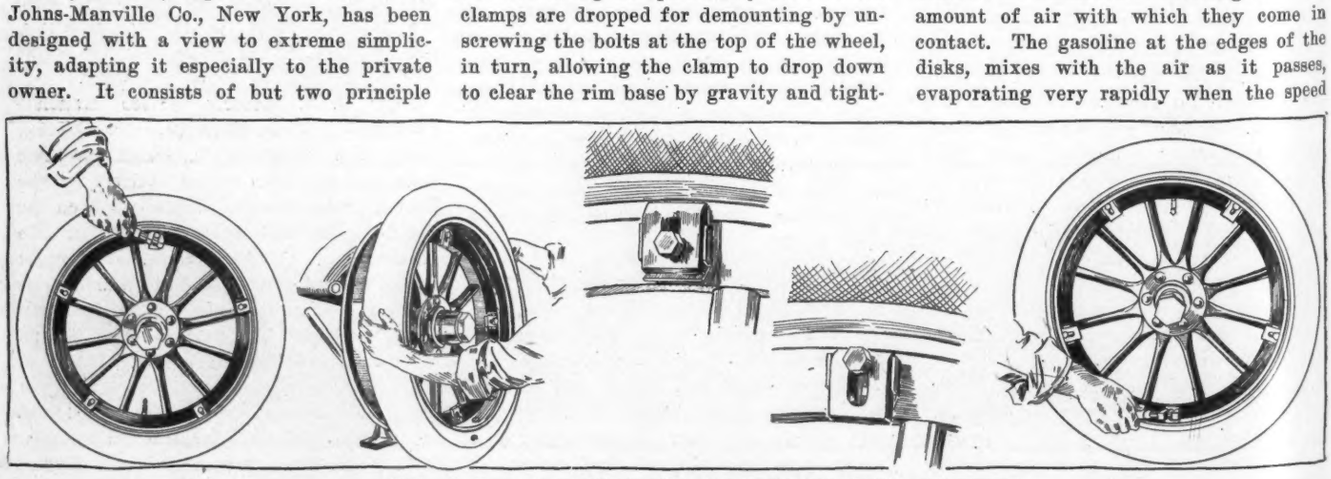


FIG. 2—J. M. DEMOUNTABLE RIM—DEMOUNTING FEATURES

Novelties for Use of the Motoring Public

of the air is fast, but not so rapidly when its speed is slow.

To lessen the proportion of air to gasoline at high speeds, the air-valve V is provided. This valve is in the form of a funnel-shaped tube that rises in response to the air pressure, as augmented by the engine suction, and is lowered by the spring S, when this pressure becomes less, as at slower speeds. The action of the throttle is as usual. But one adjustment is provided, which, it is stated need never be molested, once the proper adjustment for the engine has been obtained. This is in the form of a needle valve, in the top of the feed tube.

A metal float is used, which required no adjustment, and mica windows at the side of the float-chamber permit of observation of the float level. The Air-Friction Carbureter Co., Dayton, O., is the manufacturer, and the Gray & Mack Sales Co., Chicago, is the western distributor.

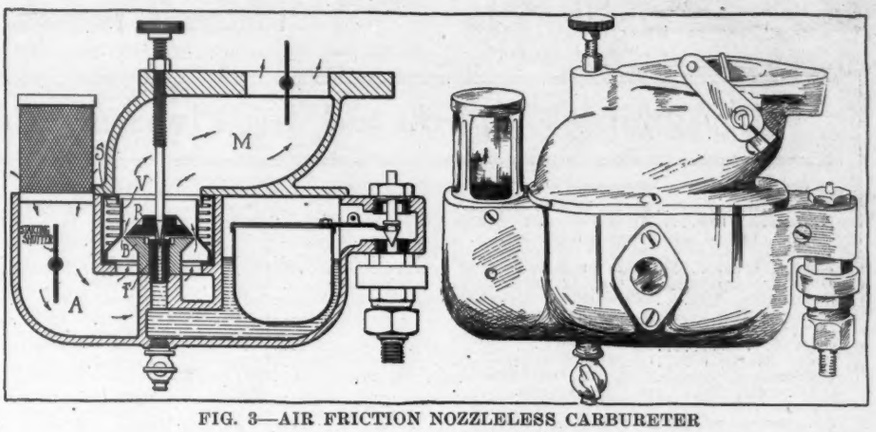


FIG. 3—AIR FRICTION NOZZLELESS CARBURETER

Turner Motor Washer

Like cures like but there is something better than elbow grease for the removal of motor grease. That is gasoline vapor. When vaporized and projected in a strong stream on the parts to be cleansed, gasoline is not only most efficient as a cleanser, but this is the most economical method of using it. A good way in which to use it in this manner is with the aid of the Turner motor washer, Fig. 4, which is a small hand instrument holding a quart of the fluid, which operates on the principle of a blow torch, with the exception of the substitution of a spray nozzle instead of a burner. It consists of a tank of drawn brass, fitted with a Turner non-leaking filler plug. The handle of the device is in the form of a hand pressure-pump with which pressure in the tank is pumped up, forcing the air and gasoline in the form of a fine stream to cut caked and obstinate grease, and to reach inaccessible parts of the surface; or a wide spray, which quickly drenches the motor. Gasoline, however, should be used with extreme caution, as in the carbureter condition in which it issues from the device, it is dangerous. Kerosene may be used with equally good results, with safety, for indoor cleaning. It is said to be useful in spraying or watering plants or poultry, also. It is made by the Turner Brass Works, Sycamore, Ill.

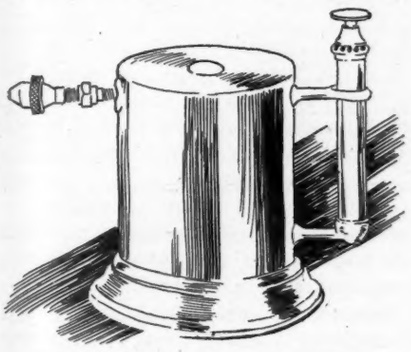


FIG. 4—TURNER MOTOR WASHER

Gilson Motor Starter

For those motorists who experience difficulties in starting, the Gilson Motor Starting Co., Indianapolis, Ind., has produced the Gilson motor starter and speeder. This device is a priming outfit, which contains the distinctive feature of a warm air intake. The supply of gasoline is carried in a small brass cup on the dash, which feeds to a three-way valve. From this valve a tube leads to the exhaust manifold, around which it is wound once, and another to the inlet manifold, into which it is lead, about 3 inches above the carbureter. In starting, the valve is turned to horizontal, allowing a small quantity of gasoline to pass from the container to the inlet manifold. The motor is then cranked, which causes a suction through this pipe and draws the gasoline into the cylinders, where it is ignited. This suction draws air through the tube leading from the exhaust manifold, which upon the starting of the motor, becomes hot, so that the mixture is preheated before entering the cylinders, which makes for efficiency and fuel economy.

Rust-Proof Metal Preservative

Claimed to be immune to the action of water, air, ammonia, alkali, acid, smoke, brine, lime, etc., Kane's metal preservative is offered to all users of metal as an outer covering that serves not only as a paint, but preserves the metal against all forms of oxidation, such as rust, corroding, etc., and which, it is said, will not crack or peel, but becomes a part of the metal, which cannot be separated from it. It is usually made in a deep black color, but can be furnished with coloring matter in its composition. It is prepared by a secret formula, which was discovered by accident by a compounder of printers' inks, who intended it for printing, but produced a metal preservative. It is especially adapted to iron bridge work and construction, but has its application to motor cars. It is used as a paint for rims, in which use it is said to make them immune to rust for life, and to be non-injurious to rubber. The Metal Preservative Co., Chicago, is the compounder.

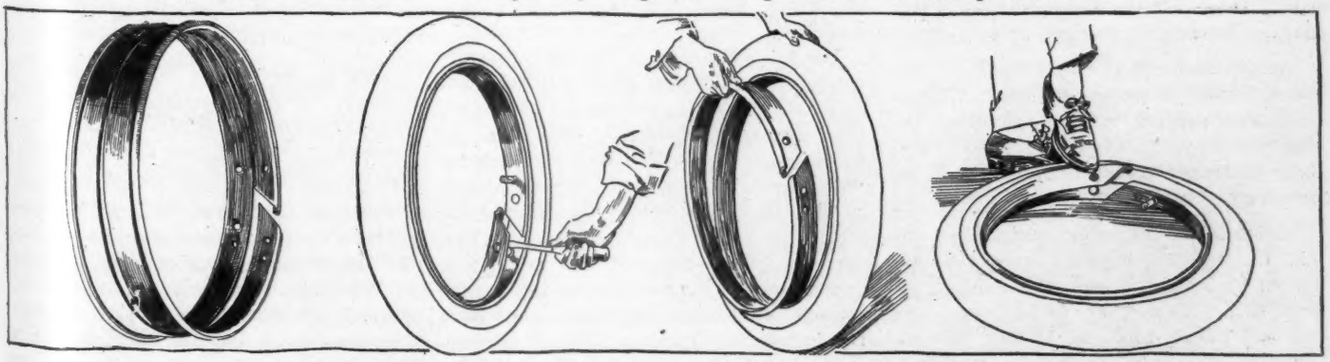


FIG. 5—DETATCHING ARRANGEMENT OF J-M DEMOUNTABLE RIM

Brief Business Announcements

Agencies Appointed by Pleasure Car Manufacturers

Town—	Agent	Car
Aledo, Ill.	E. B. Miller	Moon
Anderson, Ind.	Anderson Automobile Co.	Cole
Baxter, Ia.	Hager Brothers	Cole
Bayonne, N. J.	W. H. Dykeman	Cole
Boston Mass.	Dodge Motor Vehicle Co.	Buffalo
Blue Springs, Neb.	A. H. Krauss & Co.	Cole
Burlington, Vt.	Churchill & Lockwood	Cole
Canton, O.	E. J. Quigley	Cole
Canton, O.	Auto Service Co.	Moon
Canton, Ill.	Guy Coleman	Cole
Cedar Bluffs, Neb.	Ostrand & Lampert	Cole
Clarksburg, W. Va.	S. Scott Thompson	Cole
Clarksdale, Miss.	W. E. Campbell	Cole
Clio, S. D.	Covington & Smith	Cole
Charleston, W. Va.	J. H. King	Cole
Columbus, O.	Kaiser Motor Car Co.	Hupmobile
Columbus, O.	Engle & Vincent	Locomobile
Columbus, O.	Engle & Vincent	Velie
Columbus, O.	Snyder Automobile Co.	Abbott-Detroit
Columbus, O.	Edward Miller	Premier
Columbus, O.	Franklin Cycle & Supply Co.	Cole
Columbus, Neb.	A. J. Dischner	Cole
Cortland, N. Y.	Letts & Farrell Co.	Cole
Decatur, Ill.	North Main St. Garage	Moon
Dalles, Ore.	K. B. Kirk	Cole
Fort Smith, Ark.	Beehmer & Sheridian	Cole
Fremont, O.	J. R. Kiser	Cole
Greenwood, Miss.	W. S. Wright	Cole
Harrisburg, Pa.	Andrew Redmond	Maxwell
Harrisburg, Pa.	Andrew Redmond	Autocar
Harrisburg, Pa.	Harrisburg Auto Co.	National
Harrisburg, Pa.	Harrisburg Auto Co.	Reo
Harrisburg, Pa.	Harrisburg Auto Co.	Abbott-Detroit
Harrisburg, Pa.	Harrisburg Auto Co.	Oakland
Harrisburg, Pa.	Harrisburg Auto Co.	Chase
Harrisburg, Pa.	Keystone Motor Car Co.	Flanders
Harrisburg, Pa.	Keystone Motor Car Co.	Chalmers
Harrisburg, Pa.	Keystone Motor Car Co.	Studebaker
Harrisburg, Pa.	Keystone Motor Car Co.	E-M-F
Harrisburg, Pa.	Paul D. Messner	Stanley
Harrisburg, Pa.	East End Auto Co.	Overland
Harrisburg, Pa.	Crispen Motor Car Co.	Cadillac
Harrisburg, Pa.	I. W. Dill	Hudson
Helena, Ark.	B. L. Lyford	Cole
Houston, Tex.	Northrup & Clark Co.	Moon
Itta Benna, Miss.	Townsend & King	Cole
Jonestown, Miss.	L. F. Weathersby	Cole
Keelogg, Ia.	Craven & Moberly Co.	Cole
Knoxville, Ia.	L. L. Bybee & Co.	Cole
Lebanon, Ind.	A. Lofland & C. Layton	Cole
Lexington, Miss.	E. Norquist	Cole
Louisville, Ky.	Miles Auto Co.	Cole
Marion, Ind.	W. Hillsamer & Son	Cole
Marrigold, Miss.	W. B. Park	Cole
Marshall, Mo.	Tipping Brothers	Cole
Marshalltown, Ia.	J. H. Fisher	Cole
Mason City, Ia.	Clover Leaf Co.	Cole
Meridi Yucatan, Mex.	W. H. James	Cole
Meridian, Miss.	E. S. Curtis	Cole
Mobile, Ala.	Block Brothers	Cole
Moro, Ore.	W. H. Moore & Co.	Cole
Mt. Pleasant, Tenn.	J. M. Granberry	Cole
Moneta, Ia.	Louis Ruwe	Moon
Mechanicsburg, Pa	Charles Schroeder	Klinekar
New Haven, Conn.	Knight Garage	Cole
New London, Conn.	Lathrop & Smith	Cole
Oblong, Ill.	Oblong Auto Co.	Cole
Oil City, Pa.	C. H. Weaver	Cole
Oklahoma City, Okl	Oklahoma Motor Car Co.	Cole
Oakland, Miss.	Crow & Marder	Cole
Petersburg, Va.	W. P. Atkinson Co.	Moon
Providence, R. I.	Pawtucket Auto Co.	Cole
Phillipsburg, Pa.	H. B. Scott	Klinekar
Rock Island, Ill.	Trerer & Snyder	Cole
Steelton, Pa.	Bartram Shelly	Klinekar
Savannah, Ga.	Edward J. Thompson	Klinekar
Scranton, Pa.	Harry S. Smith	Cole
Shreveport, La.	W. K. Nulsen	Cole
St. Marys, W. Va.	R. W. Russell	Cole
St. Louis, Mo.	Bagnell Auto Co.	Cole
Summerville, Tenn.	C. A. Oliver	Cole
St. Paul, Minn.	Owl Garage	Woods
Tarboro, N. C.	J. B. Pennington Co.	Cole
Toronto, Can.	Automobile Sales Co.	Moon
Van Meter, Ia.	H. V. Van Meter	Cole
Washington, Mo.	C. A. Krumsick	Moon
Wheeling, W. Va.	A. W. Loe	Cole
Worcester, Mass.	Palace Auto Co.	Cole
Youngstown, O.	Regal Sales Co.	Moon
Ypsilanti, Mich.	Cary S. Davis	Cole
Zanesville, O.	Wedge Garage Co.	Cole

OTTAWA, Ont.—The McLeod garage has opened its doors under the management of Sid Clemens and Thomas Baird.

Buffalo, N. Y.—The Buffalo-Hudson Sales Co. has moved into temporary quarters at 1133 Main street, opposite Summer street.

Holden, Mass.—The J. W. McIntosh Co. has just been incorporated at Holden to engage in the motor business. Mr. McIntosh is president and treasurer and Bertha M. and Henry Sickels are directors.

St. Paul, Minn.—Warren L. Seeley, secretary of the St. Paul Commercial Club, has resigned to associate himself with Merritt J. Osborn in the distribution of White gas and Detroit electric cars from St. Paul.

Acton, Mass.—The Davis-King Co. has been formed at Acton to deal in motor cars and supplies. It is capitalized at $20,000 and A. W. Davis is president; Hobart E. Mead, treasurer, and B. A. King, secretary.

Philadelphia, Pa.—The Lozier Automobile Co., 227 North Broad street, has acquired by long-term lease the stable property, 66 by 184 feet, at the southwest corner of Twenty-first and Ludlow streets. Approximately $40,000 will be expended to reconstruct the building at present on the site into a motor car sales building and garage.

Portland, Me.—W. M. Chellis, the Franklin dealer here, will soon open a service station at 684 Congress street.

Louisville, Ky.—The Yager Motor Car Co., agent for the Hupmobile and Peerless, has moved into the new garage at Third and A streets.

Philadelphia, Pa.—Through J. M. Aicher, a syndicate of car dealers is negotiating for the purchase of a property measuring 400 by 150 feet, bounded by Thirtieth, Thirty-first, Locust and Spruce streets, on the site of which it is purposed to build a huge warehouse to store automobiles.

Elmira, N. Y.—James Whitney, recently retired from the firm of Bishop & Whitney, has formed a new partnership with his brother, Albert E. Whitney, of Canaseraga, N. Y. The Whitney brothers will conduct garage in a building just purchased for $10,000 at foot of Dewitt street, corner of East Water street. The new structure is two stories in height and dimensions are 50 by 100 feet. The new concern will handle the Ford. Although the partnership between J. Bruce Bishop and Albert Whitney has been dissolved by mutual consent, Mr. Bishop will continue as proprietor of the garage at Baldwin and Gray streets, Elmira.

Dayton, O.—The Goodyear Tire and Rubber Co. has established a branch at Dayton at 15 East Second street.

Minneapolis, Minn.—Harry J. Mich, representing the Franklin and Knox lines, pin avenue, with the Regal Sales Co., Inc.

San Francisco, Cal.—Frank G. Miner has recently been appointed manager of the San Francisco branch of the Kelly Motor Truck Co.

Galion, O.—The Cleveland and Galion Motor Truck Co. has filed papers with the secretary of state decreasing its capital stock from $500,000 to $300,000.

Detroit, Mich.—The Ford Motor Co. of Canada, Walkerville, Ont., announces the engagement of A. N. Lawrence as sales manager. Mr. Lawrence formerly held a similar position with the Motor Wagon Co.

Fond du Lac, Wis.—The E. W. Clark Motor Co., owning and operating one of the largest agency and garage businesses in Wisconsin, is planning to considerably increase its storage and repair facilities. The company is district representative in the Fox river valley of the Jackson and

Premier, and has just closed for the state agency of the Hupp Motor Car Co., of Detroit, to handle its line in Wisconsin.

New Orleans, La.—Oakland cars are now represented in New Orleans by a sales branch in charge of W. C. Gray.

San Francisco, Cal.—C. E. Osborn has succeeded Harry Croninger as Pacific coast manager of the Speedwell Motor Car Co. in San Francisco.

Vancouver, B. C.—Charles A. Ross, of the McLaughlin Carriage Co., Ltd., has been appointed manager for British Columbia, succeeding H. W. White.

Philadelphia, Pa.—E. K. Leech has been made manager of the new Oakland branch in Philadelphia. Mr. Leech was formerly connected with the Automobile Truck Magazine.

Minneapolis, Minn.—Contracts have been let by the Searchlight Gas Co., Chicago, for two additions to the Minneapolis plant at 2400 University avenue S. E. They will be ready February 1.

Minneapolis, Minn.—The Studebaker Corporation Minnesota branch will erect a building, 44 by 100, at Fourteenth street and Hennepin avenue, on the new motor row in Minneapolis. The car business is now handled from the main building at Sixth street and Second avenue S.

Boston, Mass.—The American Marine Equipment Co., Boston, Mass., has had its name changed to the American Motor Equipment Co., owing to the fact that it has embarked in the motor accessory line and this business is now larger than the original marine engine line it also carries on.

Washingon, D. C.—The United States Tire Co. has established a branch at 1303 H street, N. W., with E. H. Johansen as manager. The building at that number is being remodeled and when finished will be three stories high. Johansen will also manage the Baltimore branch to be opened January 1 next.

Austin, Tex.—The Oakland Motor Co. of Jersey City, N. J., has been granted a permit to do business in Texas. It has established headquarters in Austin with T. B. Cochran as agent. The capital stock of the company is $10,000. This company already has an extensive branch in San Antonio and recently established a branch at Houston with A. H. Challinor in charge.

Minneapolis, Minn.—The Twin City Motor Car Co. headquarters in Minneapolis, has filed letters of incorporation at Lemmon, S. D., capital $60,000. E. C. Thompson, former sales manager for the Abbott-Detroit, is to be manager. Paul J. Kallman, St. Paul, is president. The company will handle the Flanders gas and electric cars in Minnesota and parts of adjoining states. In St. Paul the company will handle the Saurer-Mack truck and the Detroiter. C. R. Newby, district manager, with Minnesota, the Dakotas, eastern half of Montana and parts of Nebraska, Iowa and Wisconsin in his jurisdiction, will have his office in the Minneapolis branch. Sites will be selected in both cities.

New Haven, Conn.—A. Fisher has severed his connection with the Mayo Radiator Co. and has removed to New York.

Toledo, O.—The McNaull Automobile Tire Co. has filed papers with the secretary of state increasing its capital stock from $50,000 to $75,000.

Baltimore, Md.—The local branch of the Goodyear Tire and Rubber Co. will move into its new quarters at Cathedral and Preston streets within a few weeks.

Austin, Tex.—A. W. Jones has taken charge of the Houston branch of the Ford Motor Co. as manager. He was formerly assistant manager of the Ford branch at Seattle, Wash.

Philadelphia, Pa.—Additional show room quarters for the Baker electric have been established at 1927 Market street by the Carroll A. Haines Co., Twenty-second and Spring Garden streets.

Boston, Mass.—The Ultra Motor Car Co. is the latest to be formed in Boston and it has a capitalization of $100,000 with R. H. Randall, president; Elisha A. Bagg, treasurer, and C. A. Parker, secretary.

Boston, Mass.—C. C. Edwards, who was manager of the Boston branch of the Marquette Motor Car Co. until it was discontinued in the Hub, has joined the sales force of the Boston branch of the Buick company.

Louisville, Ky.—Announcement is made of the formation of the Southern Motors Co. with a capital stock of $100,000. A. T. Hert will be president; R. A. Whitehead, of Detroit, general sales manager, and R. L. McCormick, vice-president. The company has closed a contract for the agency of the Hudson.

Boston, Mass.—George L. Lighthall, formerly manager of the Boston branch of the Marquette, has accepted a position with the Republic Motor Car Co., handling the Chevrolet and Little cars, and Ervin E. Stevens, until recently a member of the sales force of the Boston Matheson branch, has gone with the Henley-Kimball Co., handling the Hudsons.

Winnipeg—The Canadian Motor Co., Limited, has been organized with a capital of $500,000, to acquire the business at present carried on by the Fort Rouge garage and to handle the agency in western Canada for the Locomobile, Wolseley, Hudson, Cutting, Cameron gasoline cars and the Detroit electrics. The managing director of the company is E. S. Sherwood, president of Canadian Supply Co. This new concern will control three garages: the Fort Rouge garage on Corydon avenue, the City garage under construction on Portage avenue, and the electric service station erected by the Free Press next to its new office building. The general office of the company will be located at the new City garage immediately it is completed, temporary offices being at the Fort Rouge garage.

Fort Fairfield, Me.—Hopkins Brothers have let the contracts for a large combination machine shop and garage in the center of the town.

Boston, Mass.—J. L. Judd, manager of the Jackson Motor Car Co., of Boston, has just had turned over to him a service station at Cambridge, Mass.

Lynn, Mass.—T. Warren Bray, proprietor of a garage, has filed a petition in bankruptcy giving his liabilities as $5,314. The assets are $1,129.

Louisville, Ky.—The Wilder Motor Car Co., agent for the Flanders cars, is occupying its new salesroom in the Franklin building, Fourth avenue near Broadway.

San Francisco, Cal.—The latest San Francisco concern to announce change in headquarters is the Reliance Automobile Co. New quarters have been secured at 1655 Van Ness avenue.

Seattle, Wash.—The Seattle agency for the Rambler has been placed with the Rambler Motor Car Co. and spacious quarters have just been opened at 307-9 East Pike street. The firm is headed by D. W. Naughton.

Birmingham, Ala.—Tops, cushions and covers are being manufactured here by the recently organized Birmingham Auto Top Co. This is the only plant of its kind in the south. The company is capitalized at $60,000, which was subscribed locally. C. R. Christopher and C. G. Ryan organized the company and are at the head of its management.

Spokane, Wash.—The Co-operative Auto Sales Co., a $100,000 corporation which was recently organized by Spokane capitalists to carry on a wholesale and retail car and supply business on a co-operative plan, has purchased the entire issue of stock of the Regal Garage Co., also of Spokane, at its par value of $10,000.

Louisville, Ky.—The Louisville branch of the Goodrich and Diamond is now located at the southwest corner of Third avenue and Breckinridge street, in the building formerly occupied by the Leyman Motor Co. C. A. Breyley, who was manager of the local depot of the B. F. Goodrich Co., is manager of the Goodrich-Diamond Louisville office.

Boston, Mass.—A change was made last week in the handling of the Chevrolet and Little cars in Boston, which had been taken on by the F. J. Tyler Corporation a few weeks ago, as an agency proposition. The Republic Motor Car Co. has been organized as a Massachusetts corporation and it comprises the factory men who are to market the output as a factory branch, with headquarters in the Motor Mart, Park square. The F. J. Tyler Corporation has moved next door, where it will continue to handle the Columbus electric and later take on some other gasoline cars. W. C.

Sills, formerly assistant manager of the Buick Boston branch, has been placed in charge of the Republic company's branch.

Vancouver, B. C.—The Cole Auto Co., Ltd., factory distributor for the Cole, has opened its new home, 1285 Pender street West.

Baltimore, Md.—The Square Deal Auto Co., Flanders agent, is putting up a new garage and service station at 413 and 415 West Fayette street.

Seattle, Wash.—M. S. Bringham, the representative for the Cadillac line, has announced plans for a large three-story garage to be erected at 915 East Pike street.

Boston, Mass.—Walter Perham, who gave up the Cadillac agency last year, has taken it on again, making his headquarters for the present at the Sawyer Carriage Co.'s place on Worthen street.

Portland, Ore.—Another new Portland firm is the Moores Motor Car Co., which will handle the Stearns. The new firm will occupy quarters in the Bolton & McFarland building at Sixteenth and Alder streets.

Amherst, Mass.—Dr. Henry E. Page has organized a company with a capitalization of $12,000 to conduct a garage business on South Prospect street, and ground has been broken for a building that will accommodate forty cars.

Portland, Ore.—L. H. Rose, northwest district sales manager of the Flanders Motor Co., announces the placing of the Flanders six with the Oregon Motor Distributing Co. headed by Frank C. Riggs, as president. The territory of the new concern will consist of Oregon, the southern part of Washington and all of Idaho. A separate company to be known as the Multnomah Motor Car Co. has been organized to handle the Flanders output for the territory immediately surrounding Portland. C. S. Mantell will be sales manager of this company.

Seattle, Wash.—Salesroom, garage and machine shop for Garford trucks and motor cars will be erected at 1516 Broadway, Seattle.

Des Moines, Ia.—The Warren Motor Co. announces the opening of a factory branch in Des Moines. R. E. Gresham will be manager.

San Francisco, Cal.—William A. Baxter, of Dayton, O., has recently been appointed sales manager of the Pan-American Motors Co. of San Francisco.

Chicago—Max D. Bendel has supplanted Fred G. Bremer as manager of the Twitchell Gauge Co., whose offices have been moved from 1256 Michigan avenue to 1200 Michigan avenue.

Detroit, Mich.—C. H. Woodruff has become publicity manager of the Buick Motor Co., Flint, Mich. He formerly was connected with the Packard Motor Car Co. in a similar capacity.

Washington, D. C.—The Washington branch of the Foss-Hughes Co., agent for the Pierce-Arrow, has opened at 1220 Connecticut avenue, N. W., with F. N. Prendergast as manager. He will be assisted by R. S. Bartlett.

Philadelphia, Pa.—The Longstreth Motor Car Co., 257-259 North Broad street, local handler of the Alco line of pleasure cars and motor trucks, will remove to the company's new sales and service building, 2126-28-30 Market street.

Boston, Mass.—Norman Halliday, for the past year manager of the Boston branch of the E. R. Thomas Motor Car Co., has secured a position with the Alvin T. Fuller Co., of Boston, in charge of the truck department, and E. C. Locke, his assistant at the Thomas branch, has joined the sales force of the W. H. Stevens Co., handling the National.

Seattle, Wash.—Gray Brothers, agents for the Havers car in the state of Washington, have recently moved into new quarters at 1418 Broadway.

Buffalo, N. Y.—W. T. Butler has been appointed by the Stewart Motor Corporation manager for the district comprising northern Pennsylvania and New York state.

Tacoma, Wash.—Homer W. Bunker of Tacoma has severed his connection with the Oldsmobile company, and will in future act as representative in Tacoma for the Lozier.

Detroit, Mich.—O. R. Hardwell has shifted from the position of advertising manager of the Paige-Detroit Motor Car Co. to one of similar duties with the Grinnell Electric Car Co.

Merrill, Wis.—The Merrill Iron Works, operating a garage and shop as an adjunct to its iron, steel and machinery manufacturing business, has been purchased from John P. O'Day by H. B. Richmond, of Merrill, and George W. Schueppert, of Oshkosh, Wis.

Minneapolis, Minn.—The Owl garage, 2315 Hennepin avenue, has taken the northwestern agency for the Woods electric. The company, composed of Fred H. Day and Harry Murphy, has opened a new garage for electric service, with 25,000 square feet of floor space.

Lowell, Mass.—Arthur J. Cummiskey, who has been with the Moody Bridge Garage Co. for 2 years, has decided to go into business for himself and he has taken on the Cole, making his headquarters for the present at the Moody bridge garage on Pawtucket and Moody streets.

Recent Incorporations

Albany, N. Y.—Carbone Co., capital stock, $200,000; to deal in rubber tires, etc.; incorporators, W. E. Greene, G. C. Leonard, W. G. Van Loon.

Asbury Park, N. J.—National Automobile Owners' Association, capital stock, $25,000.

Augusta, Me.—Star Motor Car Co., capital stock, $1,000,000; incorporators, N. L. Goodell, W. M. Sanborn.

Boston, Mass.—United States Puncture Proof Tire Filler Co., capital stock, $50,000; incorporators, R. Magee, A. Wilson.

Boston, Mass.—Eldridge Mfg. Co., capital stock, $25,000; to manufacture motor cars; incorporators, W. E. Eldridge, H. B. Church.

Boston, Mass.—Newbury Auto Co., capital stock, $5,000; directors, E. L. Rowe, G. W. Mullett, P. J. Scanlon.

Buffalo, N. Y.—Frontier Garage & Livery Corporation, capital stock, $25,000; incorporators, F. L. Hoff, G. G. Meinell, G. P. Mitchell.

Chicago—Terminal Garage, capital stock, $10,000; incorporators, A. W. Little, L. Cohn, J. L. McCarthy.

Chicago—Motor Supplies Co., capital stock, $5,000; incorporators; H. C. Maibohm, P. W. Gillett, E. M. Beauchamp.

Chicopee, Mass.—Fisk Rubber Co., capital stock, $10,000,000.

Cleveland, O.—Lozier Sales Co., capital stock, $30,000; to deal in motor cars and accessories; incorporators, W. H. Miller, A. H. Weaver, W. B. Anderson, V. C. Erman, J. H. Brown.

Detroit, Mich.—Merrals Starter Co., capital stock, $150,000; to manufacture starters; incorporators, H. B. Lowland, R. S. Neely, W. Merralls.

Detroit, Mich.—Biad Sales Co., capital stock, $10,000; to manufacture and deal in motor car accessories; incorporators, W. C. Chapman, R. P. Baubie, G. A. Breeze.

Detroit, Mich.—Sprung Carburetor & Clutch Co., capital stock, $45,000; to manufacture parts; incorporators, E. Sprung, W. Healy, J. S. Kennary.

East Orange, N. Y.—Funger Motor Trucking Co., capital stock, $100,000; incorporators, M. C. Funger, D. L. Horton, A. J. Greene.

Farmville, N. C.—Davis Motor Co., capital stock, $50,000; incorporators, J. Speight, J. R. Davis, F. R. Townsend, W. L. Joyner.

Hattiesburg, Miss.—Hattiesburg Automobile Co., capital stock, $10,000; incorporators, M. D. Fohey, H. S. Buscher, C. Ehlers.

Louisville, Ky.—Kentucky Automobile Co., capital stock, $65,000.

Louisville, Ky.—Southern Motors Co., capital stock, $100,000; incorporators, A. T. Hert, R. V. Lock, G. G. Botts, R. Whitehead, A. L. McCormick.

Memphis, Tenn.—P. R. Flanigan Auto Co., capital stock, $10,000; incorporators, P. R. Flanigan, J. J. Carrigan, T. M. Scruggs.

Mobile, Ala.—Seler Motor Co., capital stock, $3,000; incorporators, W. E. Brown, F. J. Sessler, N. R. Clarke.

Mt. Eaton, O.—Mt. Eaton Supply Co., capital stock, $60,000; incorporators, J. A. Yohn, F. B. Schlafly, C. L. Schaffer, R. Kenwell, A. Pfister, I. C. Wellbaum.

New York, N. Y.—A. M. A. Co., capital stock, $5,000; to deal in motors, etc.; incorporators, N. P. Myers, W. C. Allen, H. N. Allen.

New York, N. Y.—Globe Tire Co., capital stock, $500; to deal in tires; incorporators, R. W. Morrison, R. D. Placak, F. F. Nichols.

New York, N. Y.—Hallett Point Garage, capital stock, $5,000; incorporators, A. Kiel, Jr., T. D. Tompkins, G. Rees, Jr.

New York, N. Y.—Columbia Taxicab Co., capital stock, $5,000; incorporators, J. Graham, J. Pathe, P. Garrity.

New York—Millionaire Auto Co., capital stock, $2,000,000; to build motor cars; incorporators, H. M. Kilborn, S. McRoberts, J. A. Stillman, F. A. Vanderlip, A. W. Pritchett, P. A. Rockefeller, H. Hammond.

Newark, N. J.—Suits Mfg. Co., capital stock, $600,000; motor car business; incorporators, S. Suits, A. P. Bowne, H. J. Colway.

Newark, N. J.—Commercial Garage Co., capital stock, $10,000; incorporators, L. Kilpatrick, R. O'Gorman, S. A. Young.

Paducah, Ky.—Henry Brothers Taxicab Co., incorporators, F. Henry, T. Henry, E. E. Henry.

Pittsburgh, Pa.—Highland Motor Transfer Co., capital stock, $5,000; incorporators, J. Rommel, C. P. Schillinger, C. Gatermuth.

St. Louis, Mo.—Brashear Truck Co., capital stock, $5,000; general motor car transportation business; incorporators, J. R. Brashear, B. O. Rodes, L. S. Haslem.

St. Louis, Mo.—Elmhurst Motor Sales Co., capital stock, $10,000; incorporators, W. B. Kidder, H. H. Allyn, F. H. Bates.

Toronto, Ont.—Bulldog Tire Co., capital stock, $300,000; to manufacture tires; incorporators, W. J. Tubman.

Wilmington, Del.—Dayton Motor Trust Co., capital stock, $100,000; incorporators, E. E. McWhiney, N. P. Coffin, H. E. Latter.

Worcester, Mass.—Power Truck Sales Co., capital stock, $25,000; directors, E. Churchill, Jr., E. E. Delle, A. G. Dodge.